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THE CITY COLLEGE
OF
THE COLLEGE OF THE CITY OF NEW YORK

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GRADUATE INSTRUCTION AND RESEARCH

A REPORT OF THE PRESIDENT'S TASK FORCE

MDCCCXLVII

NOVEMBER 1, 1960

ED000664

THE CITY COLLEGE
OF
THE COLLEGE OF THE CITY OF NEW YORK

GRADUATE INSTRUCTION AND RESEARCH

A REPORT OF THE PRESIDENT'S
TASK FORCE

NOVEMBER 1, 1960

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FOREWORD

In the Fall of 1959, President Buell G. Gallagher of The City College of New York appointed a nine-man Task Force to investigate and report on the desirability and feasibility of developing graduate instruction and research at The City College. The present enrolment of some 5,000 Master's degree candidates and the present rather modest programs of research were to be brought under review; and suggestions made for the consideration of the President with reference to the future in these areas. No limiting or prescribing directives were given by the President or any other administrator. This Task Force has, of course, consulted with many members of the administration and the President in the course of its study, but the Task Force assumes responsibility for its findings, conclusions and recommendations.

The procedure has been informal, yet systematic. One or more persons investigated a particular facet of the problem, made a tentative report to the whole Task Force, and shared in the discussion which followed. The results of these discussions became the first preliminary draft of a report. Somewhat bulky and weighed down with details, this report was condensed and now appears in a form given to it primarily by Professors Gilbert Boeker and Marvin Magalaner. Additional data may be found in the appendices to the report, on file in the Office of the President of The City College.

The Task Force wishes to thank the City College Fund for an appropriation making possible this study and the publication of the report.

The basic recommendation, which was by no means a foregone conclusion as this study began, is that The City College seriously embark on a program of research and doctoral studies of high quality.

" The Task Force recommends that this be done through graduated phases of a soundly conceived program, viz.: (1) the extension of Master's degree work to most of the departments of the college and concurrent with this (2) increased scholarly research activities by faculty members, undergirded and supported by (3) the necessary material improvement of the working conditions of researchers and advanced students, including (4) schedule arrangements providing meaningful blocks of time to be devoted to research and advanced instruction, (5) adequate laboratory and office space judged by graduate and research standards (not by undergraduate standards alone), and (6) the stimulation of a general environment congenial to independent and creative faculty endeavor. No one of these items takes temporal precedence over the others—these several phases are concurrent parts of a single enterprise. Only after the program is well under way in accordance with the first six criteria, mentioned above, should full-blown doctoral work be launched in more than a very few selected fields; but the developments in the early phases of this program should be so conceived as to be sound bases for Ph.D. work as the latter may be developed.

The time is ripe for CCNY to launch this program of extended graduate instruction and research. Indeed, it may be asked whether the time is not far advanced beyond the point where these things should have been undertaken.

> The community, industry, government and institutions of higher education are experiencing an acute shortage of men and women with high quality graduate training.
>
> Present undergraduates and recent graduates of the College desire such programs and will enroll in them. These are the men and women who, during the past 25 years, have attained Doctor's degrees in larger numbers than the graduates of any other college in the nation, with one exception (University of California).
>
> The faculty of City College has the ability, training, and experience to initiate and carry through successfully the programs discussed in this report.
>
> Unless the College speedily and aggressively moves to establish and develop sound programs of graduate instruction leading to the doctorate and extensive opportunities for faculty research at the College, it will become impossible to recruit an adequate faculty for the undergraduate college in some fields and difficult to recruit in most fields.
>
> The costs of graduate instruction and research, which are not inconsiderable, must be carried by a broader segment of the community than has yet awakened to its opportunities in New York State. As in nearly every other state, the funds of the state government must be drawn on if New York State is not to lag behind in the national procession. And as in nearly every other state, private philanthropy and sponsored research must be used extensively if this public college is to hold its own within a highly developed competitive system of higher education.
>
> The administrative organization essential to this new field of operation can be devised so as to move into the new programs without appreciable shock to the existing structure.
>
> Throughout the programs of graduate instruction and research, as herein discussed, The City College starts with one great initial advantage, namely, it can now create its own traditions rather than being bound to established patterns.

Without necessarily holding with finality to any single point or part of this report, the Task Force records its general agreement with all of it, and commends it to the President for his consideration. Should he see fit to share this vision with a larger public, we confidently predict that The City College will one day have graduate programs and research worthy of the high quality of its 113-year-old liberal arts college and its three undergraduate professional schools.

GILBERT F. BOEKER, *Chairman*
ERNEST BOREK
VINCENT DELTORO
HENRY EILBIRT
BERTRAM EPSTEIN
SEYMOUR HYMAN
MARVIN MAGALANER
HERBERT NECHIN
EDWIN REUBENS

NEW YORK CITY
October 12, 1960.

INTRODUCTION

Though this Task Force was set up by the President of The City College to investigate the potential for graduate study and research at this institution, its members are keenly aware that they function on what is, basically, an undergraduate campus. They know that, for over a century, the record of achievement of the college has been more than impressive. They are, moreover, determined to preserve, and even to enhance, the position of the undergraduate schools in the future. It has been especially heartening, therefore, to discover in the course of this exploration that a vigorous and productive program of graduate studies and research is assuming overwhelming importance in American higher education, not merely for the immediate advantages that accrue to individuals and organizations so engaged, but, beyond that, to the undergraduate college, both students and faculty, who function in an environment of graduate activity.

Merely as an adjunct of the undergraduate program, graduate studies and research are clearly desirable. There are those, indeed, who argue convincingly that the absence of such pursuits from a contemporary college set-up is the first step in the deterioration of that institution. Without adequate facilities for advanced research, without affording the opportunity for association with distinguished faculty specialists, and without providing challenging courses for new teachers to teach—so the argument goes—it will soon be difficult, perhaps impossible, to attract the best young instructors to undertake a professional career at an exclusively undergraduate school and to retain them despite the lures offered elsewhere. The increasingly competitive market for college teachers, it is argued, demands reassessment of the undergraduate, graduate, and research roles of college and university respectively.

Beardsley Ruml and Donald H. Morrison (Provost of Dartmouth College) put it this way in *A Memo to a College Trustee*:

> The central question is simply this: Does it appear that this institution will be able to compete for high-quality faculty and students over the next 10 years, when competition for both will be increasingly severe? Or, stated differently, does the status quo, projected over the next 10 years, amount to a healthy institution, economically and educationally?
>
> The first critical area is the faculty. Is the college now able to compete on favorable terms with state universities and strong private institutions for the most promising young teachers? Is it able to retain the experienced teachers it wishes to keep? If so, does the college have assured means of doubling its present salary scales in the next 10 years? If it is not now able to compete, or if the doubling of salaries does not appear to be feasible, there is cause for concern.

To carry this thesis one step farther, it may reasonably be asked whether or not the teaching at an undergraduate institution may not be seriously hampered—even made ineffective—if instruction and learning are both deprived of direct contact with the latest discoveries in the several disciplines and with the people who are making them.

Rightly or wrongly, such views have been gaining currency in the nation at large. Recently, the Dean of Graduate Studies at the Massachusetts Institute of Technology spoke forcefully of the value of advanced research to an undergraduate college community: "The opportunity to do some creative work amid congenial surroundings is one requisite for attracting vigorous, productive minds to teaching. This is the important idea, because great teaching results from the association between responsive students and able, scholarly and productive faculty."* Looking at the situation from the point of view of the student, George H. Hickox, then Program Director for Engineering Sciences of the National Science Foundation, discusses the indirect benefits to be derived from graduate study and research in a school that is primarily undergraduate:

> Formal research does a number of things for the undergraduate student even though he does not participate in it directly. First, teaching at the undergraduate level will tend to become dull and routine and will certainly lag far behind current practice unless the teachers continue to grow and to develop. Such growth and development can only occur if teachers are aware of and practice the researchers' way of life . . . The institution with a positive attitude toward research will stimulate students to a high level of achievement and creativeness that will not be reached if instruction is confined merely to the passing on of facts. Second, the atmosphere in which the student learns is favorably modified by research in the institution, and course content itself is often improved if his teachers are actively engaged in research.

"Teachers," Mr. Hickox points out, "have found that increased understanding of their own fields (acquired even through applied research) has enabled them to teach the basic science to their students with fuller meaning . . . " Commenting on the practical value of such an association of educational levels, he says, " . . . an institution which has underway a program of research finds many opportunities to utilize the services of undergraduate students for participation in the work. Such actual participation serves to stimulate the interests of the students, to maintain their motivation, and to train them in the techniques of research which should be a part of the educational process."

This report begins with the question of the effect of an expanded graduate and research program upon an already existing undergraduate college for several reasons. Knowing the importance of our undergraduate college to the intellectual life of the community, we would be unwilling to recommend a major change in the nature of the school, unless the advantages of such an alteration to the undergraduate college itself were clear and indisputable.

Though there are many other reasons for the establishment of a graduate studies and research program at The City College, it should be borne in mind that our primary purpose is to improve the *quality* of education at the college. It is reasonable to assume, however, that concomitant benefits would accrue. Our position as a center of learning would be enhanced. We would be able to continue to attract the best students. We would be serving the needs of industry and of national defense. Finally, we would, perhaps, have a share in the improvement of modern civilization.

And in the larger social context, there are compelling reasons for the proposals set forth in this report. The need of the nation, the state, and the community for highly trained and adequately educated personnel in almost every branch of knowledge has long been pointed out by leaders of thought in this country. More recently, the crisis in education has been dramatized by the accomplishments in science of the Soviet Union. The shortage of qualified Ph.D.'s to offer advanced training to the constantly swelling ranks of applicants for college admission has been pointed out by scores of educators, including the President of our own college. Research as an obligatory concomitant of graduate studies is a concept so self-evident that it needs no special advocates. This report shows (1) not only that graduate studies are necessary to the community but also that they are eagerly sought for by holders of baccalaureate degrees; (2) that the nation, the state, and the city have a real need for additional opportunities for graduate study; (3) that most states consider it their duty to provide the appropriate higher education without charge or at a nominal fee; and (4) that The City College has a role to play in graduate studies and research in New York.

---

* Harold L. Hazen, in an address to a General Session of the ASEE, 1953.

Chapter One

THE SHAPE OF THE FUTURE

A. THE ROLE OF RESEARCH

In this report, we raise a series of questions with respect to research as a college and/or university function and present the view of the Task Force on each point. We deal with such questions as the following:

1. How much research is "good" for an educational institution?
2. Is the average liberal arts college doing enough to encourage and support research in this time of crisis?
3. What is the role and the relationship of non-institutional research with respect to a college or university?
4. What is the present role of The City College in research?
5. What sources of financial assistance are available to an institution which wishes to engage in research?
6. What are the specific needs of the various divisions of this college in terms of its ability or inability to undertake duties of expanded research?
7. How shall the work-load of instructors engaged in research be evaluated with respect to its place in the total program?

The Teaching-Research Work Ratio

No magic formula has yet been evolved to determine the stress which a college or university should place on classroom instruction, on the one hand, and, on the other, the emphasis to be allotted to research in what is basically an institution of "learning." Faced with numerous conflicting views, this Task Force espouses the philosophy subscribed to by most accredited institutions, as detailed by the Committee on Institutional Research Policy under the title: "Sponsored Research Policy of Colleges and Universities."* Our primary aim is the diffusion of knowledge through teaching, research, and publication. This entails the conservation of knowledge already acquired and the extension of the boundaries of knowledge.

We feel that a faculty member should discharge both duties within the bounds of his energy and opportunity. Both the scholar who regards teaching as a necessary evil and the pedagogue who has lost the desire for enlarging his intellectual horizon are of limited value to an institution of higher learning.

A recent survey of attitudes of educators (administrators) with respect to scholarly pursuits among faculty members on their staffs produced surprising results:

> Lack of encouragement [of scholarship] on the part of college administration seems to be not uncommon. In some cases productive scholarship is not just frowned

---

* A report of the Committee on Institutional Research Policy of the American Council of Education, Washington, D.C., 1955.

> upon; it is actually not permitted... In spite of the superior performance of the few, the total record of our liberal arts colleges in research and the training of scientists is not impressive. It is neither as good as it should or could be. But... it is improving as more funds are being made available for research and more attention is drawn to its fundamental role.*

On the other hand, colleges and staff members who wish to keep abreast of subject-matter advances in their specialties must devote an increasing proportion of time to study, experimentation, and contemplation. On many undergraduate campuses, research is considered a normal and necessary activity. It is conceivable that a school will eventually be required to carry on such activities merely to retain its accreditation.

We, at City College, must recognize that changing conditions force a new direction upon us. What was once essentially an effective teaching institution must be converted to a center of learning, with the dual role of contributing to knowledge as well as teaching it. The achievement of this purpose should engage the dedicated thought of every one of us.

Inadequacies of Existing CCNY Research Program

Objective consideration of our undergraduate research efforts would undoubtedly show more than adequate faculty potential: brainpower, willingness, skill, and imagination.** It would also reveal, however, that the material environment does not permit the full realization of this potential. In the Department of Chemistry, for instance, lack of office space, lack of space for laboratory research, inadequate laboratory equipment, heavy teaching loads, and the like, recently drew a warning of possible withdrawal of accreditation from the American Chemical Society Committee on Professional Training (see Appendix A-1). Blaming these conditions for an inability to attract outstanding young teachers in the department, the Committee cited the strong probability of future mediocrity in professional standing if the problems remained unsolved. Though much has been done since the warning was given, much more remains to be done.

The Department of Physics similarly finds itself forced to operate at considerably less than maximum efficiency (see Appendix A-3). Without privacy, without space, without certain essential equipment, the very real abilities of its personnel atrophy; or—an undesirable consequence—the members of the staff in Physics are forced to go elsewhere to perform their scholarly research. The Department of Mathematics, too, must meet its students and conduct its conferences in primitive, crowded circumstances which challenge the talents of the finest teacher (see Appendix A-4). Similar comments could be made for most of the departments in all four of the schools.

---

* Information provided by Lawrence Gould, "Symposium on Basic Research," National Academy of Sciences, New York, May 14-16, 1959.

The City College professors, over a 25-year period, trained more men who eventually became professional mathematicians than did any other college in the country. The were second in the training of chemists and fifth in turning out physicists and astronomers. In the arts, social sciences, and humanities, their overall rank is first in the nation. In the natural sciences, they were outranked only by the University of California and the University of Illinois in the production of interested students who eventually earned the Ph.D. degree. Information taken from **Doctorate Production in United States Universities: 1936-56, Publication #582, National Academy of Sciences, National Research Council, Washington, D.C., 1958.

These conditions, if permitted to continue, will certainly erode the high level of professional standing we have enjoyed. Yet even the most optimistic of us cannot expect total amelioration of all existing inadequacies over night. The realities of our situation in terms of income, facilities, and past practices, may force us to accept a gradual evolution rather than a sudden transformation.

The limiting circumstances mentioned above have very largely shaped the kind of typical faculty member which the college now has. Forced to carry heavy teaching loads, deprived of adequate facilities and sometimes of adequate encouragement for research, our older staff members have, in general, given primacy to their roles as effective classroom teachers. This pattern of academic life is deeply ingrained after many years and must be taken into account in any estimate of our potential for graduate studies and research.

Potential and Needs for Expanded Research at CCNY

In order to view the future of research at the college ideally and realistically, we must take an informal inventory of its material needs. Let us, then, examine the general requirements of the several divisions of the institution before proceeding further.

Humanities

No responsible member of the college staff questions the importance of encouraging research, quantitatively and qualitatively, among teachers of the Humanities as a mean of invigorating the presentation of classroom material and as a mean of extending the boundaries of humanistic knowledge for its own sake.

The research activities of a university in the area of the Humanities are especially vital to carrying on a graduate program. It is unlikely that outstanding biographers, specialists in linguistics, art historians, musicologists, and literary critics will be attracted to a school which does not foster independent research for its staff and does not provide mature and intelligent students as proper disciples and aides of this scholarly personnel.

Moreover, research in the Humanities is a highly individual, private matter. Unlike much investigation carried on by teams of specialists in the sciences or engineering or even in the social sciences, almost all research in language, art, and music involves the isolation of the researcher with his books and documentary sources. Group application is occasionally called for. (A large team conducted a mechanical, statistical survey in preparing the *Word Index to James Joyce's 'Ulysses'*, under the supervision of Miles L. Hanley, at the University of Wisconsin.) Ordinarily, however, the Humanities researcher is a lone wolf.

His principal tool is a well-stocked library, strong in his professional speciality. At The City College, the library is unusually substantial in many divisions of the Humanities. Many junior members of the staff have, in past years, relied more on its facilities than on the books and documents available in the university at which they were concurrently enrolled for their doctorates. Nor would it be difficult, ostensibly, for the library, under present arrangements, to argument its stock in the Humanities to meet the needs of research.

The investigator in the Humanities also needs what Ernest Hemingway calls "a clean well-lighted place" in which to carry on his work—a private spot for contemplation, safekeeping of his books and papers, and perhaps for writing up the results of his work. In this respect, The City College has already provided a serviceable set of facilities for some of its Humanities staff. Though there is need for additional quarters if the special staff is to be increased in numbers, the existing offices and equipment would serve qualitatively.

Equally as important as the place and the material is the time to carry on intensive research. The normal teaching load, with the concomitant obligation to read examination papers, term reports, and themes, and to prepare lessons adequately, places so severe a burden on the serious researcher that its continuance as an instructional requirement would go far toward neutralizing the advantages of available space and library materials. The college must be prepared to pay for a healthy, vigorous, exciting research environment through the additional costs involved in altering the teaching and research-load ratio.

Unlike the situation in the sciences, technology and, to some extent, in the social sciences, funds from sources beyond the college or university to support research in the Humanities are negligible. Neither foundations nor industry nor government have measurably improved facilities for study or research in the Humanities on our campus.

Limited help for individual research and development projects is available from such organizations as the American Council of Learned Societies, The Modern Language Association, the American Philosophical Society, the Ford Foundation, the Guggenheim Foundation, the Rockefeller Fund, and the Carnegie Foundation, but this aid has thus far been sporadic and unreliable as an institutional base.

It should be pointed out, however, that, in general, the sums needed to engage in research in the Humanities are relatively smaller than in other fields. Except for the well-built and expensively-equipped studios which advanced research in Art sometimes requires, most of the needed funds would go to defray the cost of salaries for those on limited teaching programs, and the rest would be devoted mainly to reimbursement of expenses for travel, microfilms, photostatic reproductions, and the like.

The role of research in the Humanities as envisaged in this report is indispensable. You can have research without a graduate school, but you can not have a good graduate school without research. To attract an augmented group of faculty members whose qualities are congenial to the highest kind of scholarship, the college or university must provide the proper ingredients of environment and personnel—must, in short, establish an *esprit de corps* which permeates administration, staff, and student body. It must create a vital community of humanistic scholars which, though its members may be working independently on decidedly individual problems or projects, thrives communally by mutual contact as an intellectual colony.

There must be recognition of the need for leisure, convenient meeting places for faculty (and for faculty and students outside the classroom), and the knowledge that distinction in research is as significant as are administrative, teaching, extra-curricular, and other talents—a judgment which is expressed in concrete terms of tenure, promotion, and salary adjustments. The researcher in the Humanities can seldom hope to augment his income meaningfully through research, as his counterpart in science, technology, or social science often does. For him, therefore, suitable material recognition is generally more important within his institution than it would be for staff members outside the Humanities.

Social Sciences

Much which has already been said about the research role of the university in the Humanities applies equally well to the social sciences. There are, however, some noteworthy differences.

In the fields of inquiry, research activities are valuable as a means of stimulating and improving the quality of teaching. Similarly, research opportunities are needed in all fields in order to attract distinguished faculty members to a school, and thus, indirectly and directly, to attract outstanding graduate students. The Humanities and the social sciences diverge from the natural sciences, however, in not ordinarily requiring elaborate or expensive plant and equipment. In the social sciences a temporary faculty can often be secured for research jobs without teaching, and for teaching without research.

In fact, the low cost of research facilities in the social sciences forms a prime contrast with the situation in the natural sciences. For the former, the chief requisites are a library (nearby, if not actually in the university) and free time. A salary large enough to make supplementary-income jobs unnecessary is also essential. In some branches of the social sciences, travel funds and research assistants are additional needs. Altogether, however, the costs of social science research are slight in contrast with the laboratory and model-building costs of physical science investigations.

Another notable difference in social science research is its sources of support. Whereas academic personnel in the natural sciences can count on government and business for much of its sponsorship, social science academicians receive such support only in a few specialized branches and must depend mainly on the free or released time of faculty, in addition to grants from the great foundations.

Like the investigator in the Humanities, the worker in the social sciences has done his labors virtually alone, up until very recently. The new development is group projects, in which the individual researchers work more closely together than is usual in physical science group work. There is especially close coordination when the results of the research sections are absorbed into the group report in which the individual contributions lose their identity. Such pooling of findings applies even to portions of projects farmed out to personnel at other universities, who can work in their own locales and with their own facilities. Still another related development is the recent growth in universities of research institutes largely or wholly divorced from teaching (such as the Center of International Studies at M.I.T.).

Research in the social sciences is especially important as a university function because, under university auspices, research can concentrate on "basic" knowledge and "pure theory" facets of the subject, which get relatively little attention from agencies of social science research outside the university (with the exception of certain specialized branches in, for instance mathematical economics). Equally significant is the independence of the academic scholar—particularly urgent in the social sciences because of the role of social-value judgments pervading the whole subject matter and tending to produce conformity of thought and policy. On the other hand, the distinction between "basic" and "applied" knowledge is less clear-cut and indeed less meaningful in the social sciences than in the natural sciences, and there is good reason for keeping these two aspects of knowledge closely related rather than separated, whether in choosing research subjects or in selecting a faculty in the social sciences.

Opportunities for social science research can be provided with relative ease and at relative low cost in the environment of New York.

Business

Research in schools of business, as in institutions devoted to the Humanities and social science, requires few inordinately expensive items in order to operate effectively. It needs library facilities, including the relatively small amount of specialized statistical, legal, map, and continuing research service materials; time in which to do the work—especially the vital fieldwork like interviewing; and finally, in some instances, a computer investment or the allocation of a fair portion of computer investment when shared with other areas of research work. Adequate clerical and secretarial assistance is important.

There is universal agreement that schools of business should undertake to be leaders in research in business, particularly in developing new ideas. Some high-quality "pure" research is being carried on in a few educational centers: however the quantity of such studies is not large. The great bulk of business research is carried on outside campus boundaries by business organizations of all kinds, by government bureaus, and similar units. Much of the business research done by educational institutions is a matter of individual faculty members acting as "experts" in accounting, statistics, marketing, credit, management, and the like. Such research is paid for by the commissioning organizations, which prefer the objectivity, prestige, and intellectual discipline afforded by affiliation with a university faculty. In certain instances, campus researchers are able to secure data not available to commercial institutions.

A number of schools of business are also involved in sponsored research. In such instances, a university unit acts as an intermediary, securing contracts from a business or other organization to do a specified job of research. Sometimes, administrative control rests in an all-school unit. Sometimes, business research operates through a business research bureau, the results of the investigation being confidential on certain occasions, public on others. Sometimes the research will be done by one man, sometimes by a team.

Research in business has extremely ill-defined boundaries. The line of demarcation between economics and business administration is still indistinct. Psychology, sociology, anthropology, and even political science have brought their work to the borders, and into the very domain, of business research through applied research in industry. Classic examples are studies of the Western Electric Company and the Office of Naval Research Studies on supervision and management, where business research has gone far beyond the business school for researchers.

In fact, business research began in its application to engineering matters. In the training of salesmen, to offer another example, business research and education share a common frontier. A tradition of interdisciplinary effort may well be evolving here in which fruitful ideas are the products either of team efforts or of the interaction of specialists from different areas.

Hence, the main consideration in business research work in the university may well be the assembling of a balanced group of interested faculty. Industrial experience, training in the social and behavioral studies, even mathematics and logic, are essential to the research team of the business school, provided there is a certain willingness to cut across the established boundaries of the several disciplines.

Natural Sciences and Engineering

As with business research, explorations in the natural sciences and engineering are not restricted to the university. Private research institutes and industrial laboratories, as well as government research units, share the burden and the glory. Indeed, one estimate places the total spent on industrial research laboratories alone as 65 per cent of the entire expenditure for all research activities.[*] This being so, overlapping among public, private industrial, and university research is inevitable. Merely designating the vague province of each research arm is advisable here.

Quite obviously, government laboratories will be concerned primarily with setting up and maintaining standards for the public. Their role in national defense is paramount, and they carry on fundamental research in matters immediately related to the public interest. For their part, industrial laboratories are rightly concerned first with the immediate and practical application of scientific principles to a useful industrial end. Thus, what remains for the university essentially is exploration of "basic" scientific problems, though this limitation does not preclude the study of practical matters, provided they offer substantial educational value to the persons so engaged.

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[*] Monroe E. Spaght, "Basic Research in Industry," Science, Vol. 121, (1955).

Men in important industrial positions argue that the major responsibility for basic research should be lodged in the universities. The reasons are cogent: university researchers are not limited by the horizons of present interest; university faculties contain independent thinkers, willing to break new ground in scientific explorations; results of university research are ordinarily published and distributed promptly and freely; university research is an important part of the mechanism of training many future industrial scientists; by combining research and education, the university is able, at one blow, to offer enhanced training to its students and a low cost estimate on the project research job.[*]

Education

Research in Education, as a multi-faceted discipline, ranges over many fields: philosophy, history, psychology, sociology, management, the communication arts, and, in fact, indirectly over each of the curriculum areas for which schools are responsible. Hence the cost and the character of research in Education will vary.

While some of the research in this field will be the "humanities" type, capable of being done by persons working singly and with recourse largely to printed sources alone, most of it will entail cooperative work involving surveys, testing, and actual experimentation. Above all, ample opportunities for interdisciplinary interaction and the leisurely interchange of ideas need to be provided.

Since much of the research in Education will be "action oriented," provision for consultative relationships with school personnel and the further development of affiliated schools will be necessary. As the counterpart to research in the field, laboratory facilities are needed within the College, in which pilot studies can be conducted before measures are tried on actual pupil populations.

As with much of the work of the social sciences, newer types of equipment for making recordings, effectuating complex computational operations, and the like, will be needed.

Means of Financing a Research Program

Both as a matter of practical necessity and as a matter of sound theory, the university must look to the government (i.e., the federal government, the state, and the city) for financial backing in carrying forward fundamental research in the natural sciences and engineering on the campus. What industry does not choose to sponsor and what the college cannot afford to undertake must be supported by the community, for it is the community that will benefit from the successful results of the experimentation.

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[*] **Clifford F. Rassweiler (Johns Manville Corporation), "Basic Research, an Industrial or University Function," Chemical and Engineering News, February 13, 1956.**

In this statement the Task Force has the concurrence of such eminent organizations as the National Academy of Sciences, the American Association for the Advancement of Science, and the Alfred P. Sloane Foundation, whose "Symposium on Basic Research," in 1959, included such participants as President Eisenhower, James F. Fisk, of Bell Telephone Laboratories, and such academic leaders as Conrad A. Elvehjem, President of the University of Wisconsin, and Buell G. Gallagher, of our own college.* The printed account of this meeting is replete with exhortations to greater effort on the part of government. "Research in every realm of a people's legitimate interest is an appropriate function of the people's organized self, the state, and the people's organized instrument of research, the State University." In like vein, President Elvehjem asserts: "Indeed, it is safe to say that there is no field where larger government expenditures would produce as rich a return as greater outlay on research and also on the necessary foundations for research, the education of a talented people." He concludes:

> I believe the State Universities can contribute much toward the successful furtherance of our national scientific efforts, particularly in the areas we designate as basic research; but as we expand in these fields, we must be assured of the kind of financing which will permit us to build our programs on a long-term basis and which will help us to solve more problems than we create. It will also help us in our efforts to broaden the educational experiences which we attempt to provide.

Striking a note of caution, the Director of the National Science Foundation, Alan T. Waterman, told the delegates that "the potential of the country in science and technology is far from being realized. The element most requiring attention is a greater degree of support throughout the country for basic research and for the education and training of scientists and engineers."

This Task Force believes emphatically that any program of graduate research in the sciences and engineering must receive a minimum basic financial support from state and local government sources to ensure the stability and continuity of projects that may be undertaken.

This belief does not mean that the university should ignore offers of financial assistance from industry or from the federal government, as well as help from specialized foundations. The university may wish to take on secret projects even though their educational value is somewhat impaired by such classification. Tasks of this kind still offer advantages to the institution. Such activity on the campus often brings revenue and valuable research equipment to the school, gives employment opportunities to needy graduate students, increases the degree of intellectual activity at the college, and, very possibly, produces results that benefit the nation.

If the government project requires no secrecy classification, educational benefits to the students involved in the work multiply. Most desirable educationally are those contracts which seek merely to stimulate activity in general areas of research—the kind of project often obtained from such organizations as the Air Force Office of Scientific Research, the National Science Foundation, the Office of Naval Research, the Office of Ordinance Research, the United States Atomic Energy Commission, and the United States Public Health Service.

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* American Association for the Advancement of Science, Washington, Publication #56, "Symposium on Basic Research," May, 1959.

Yet, as generous and liberal as these agencies may be, many scientists object to their "emphasis on plan." They resent the inhibiting influence of having to detail in advance the problem to be investigated, to summarize all previous work on the subject, outline the plan of attack, and estimate the costs of experiments. They point out that research which can be described in advance often is not actual research and that changing of plans often is essential for the innovating scientists. Only with the support of the whole community, these scientists say, can unhampered basic research flourish.*

There are those who oppose the acceptance of government research contracts because they feel that government support inevitably leads to at least some measure of government control. The point is worth a brief digression in this report.

It is to the credit of the various governmental sponsoring agencies that the stated policy** toward research workers in unclassified fields is only what would be expected of every loyal citizen.

1. The test in the award of grants and contracts for unclassified research should be the scientific integrity and competence of the individuals responsible for carrying out the research and the scientific merits of their program.
2. When an official of the government comes into possession of evidence which in his opinion indicates the possible existence of disloyalty in violation of law, he should promptly refer that information to the federal agencies of law enforcement established to deal with such matters.
3. An allegation of disloyalty should not by itself be grounds for adverse administrative action on a grant or contract for unclassified research by scientifically competent investigators; if the indications of disloyalty appear sufficiently serious to warrant any action at all, the government in the opinion of the committee has no other course than to bring formal charges and to produce the evidence in open hearing before legally constituted authority.

An investigation of the political beliefs of the staff members working on "classified" projects is quite a different matter. Such persons are a part of the military defense of this country and should not be so employed unless there is absolutely no possibility of divided allegiances.

The above does not greatly trouble the members of the Task Force. Another type of control does. It is one which is inherent and unavoidable when the policy of a university allows research to be sponsored without reference to the university's own definition of its role.

If a school relies upon unrelated categorical grants for its major research support, it is likely to develop imbalance in its own operations, and to overlook many a possible break-through in pure science because of excessive emphasis on immediate practical results.

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* See Kenneth S. Pitzer, "Role of the University in Basic Research," Science Vol. 121, June, 1955.

** Charles V. Kidd, American Universities and Federal Research, Harvard University Press, 1959.

President Dodds of Princeton states the problem thus:

> The phrase 'project research' has come to describe a special pattern of research undertaking in which the source which furnishes the funds does so with the understanding that the research will be directed to solving a problem in a specific area which has been mutually agreed upon in advance.
>
> With the abundance of project research money currently available, we are in danger of succumbing to a new disease for which no antibiotic drug has been discovered; namely 'projectitis.' Projectitis is an unhappy addiction to limited objectives, perhaps at the very moment at which the individual should be broadening his own comprehension and deepening his knowledge of his discipline, with freedom for roving speculation in an atmosphere unencumbered by the pressures of problem-solving commitments to external agencies.
>
> Competent observers are particularly concerned regarding the effect of over-indulgence in projects upon our young scholars and scientists. They fear that there are a goodly number of such throughout our universities whose future contributions to learning are being reduced by preoccupation with the limited objectives of project research. . . .

Yet we must be practical. As much as we would like financial support for any scientific investigation that might arouse the curiosity of a competent staff member, we must accept the funds necessary for research where we can find them. However, we should always strive to obtain as much support as possible for "free investigations" from the state and alumni. Indeed, it is probable that the course of action which in the long run proves to be most practical is one which assesses every proposed research project in the light of certain governing principles. Primary among these principles will be the maintenance of the integrity of the university and of its researchers. Research which brings contract monies to the university at the cost of academic integrity is too expensive to be accepted.

B. GRADUATE STUDIES

As with research, so with graduate studies, a major reason for recommending the establishment of a graduate program at any undergraduate institution must be the enrichment of the existing organism by the nourishment derived from the new. Man's knowledge now expands daily at such a rate that constant study and investigation are mandatory for the teacher/scholar who would bring to his classes the spirit of intellectual awareness. The doing of research, the teaching of graduate courses in his specialty, the contact with other faculty members and students similarly engaged—all these activities are essentials of a program which looks beyond the Bachelor's degree. More significant, however, to members of this Task Force, is the conclusion that our undergraduate schools, as well, need an augmented program of graduate research and study in order to maintain their excellent record.

Other reasons command our attention and our imagination too. We must consider, in the pages that follow, the needs of the nation, the state, and the city; the requirements of industry; the cry for more college teachers who have been trained in the several disciplines; the need for low-cost graduate programs; and other allied urgencies.

Student Needs

To those of us who have worked in the academic vineyard for more than a decade, undertaking to "prove" that students "need" and want graduate study seems patently unnecessary. Semiannually, professors are beset by eager graduating seniors, each wishing multiple letters of recommendation for admission to the university of his choice—and to five or six others if the need arises. These students know that the baccalaureate degree nowadays is the "union card" to no professional career, that, in fact, even the Master's degree is often considered by authorities in industry, education, and the learned professions generally merely as a stopgap distinction, a milestone on the road to the doctorate.

Yet proof, if needed, is available. Professor Oscar Janowsky, of The City College, reports almost unanimous agreement among industrial companies and agencies replying to his questionnaire that some graduate training was desirable for employees engaged in specialized tasks.[*] Indeed, it is common practice for local industries to allow, and even to encouarge, their employees to attend graduate courses on company time.

On a national scale, a distinguished report by George Gropper and Robert Fitzpatrick demonstrated only last year that, of a selected sample of 3,038 students, fifty-four per cent wanted to attend graduate school for practical reasons: to obtain positions, to improve job rewards, to decide on a career, and to gain job experiences. Only twenty-one per cent, interestingly enough, gave as their reason for attending graduate school: "to learn more."[**]

Chief among student needs seems to be a graduate program that young people with average financial means can afford. Statistics in the Gropper report are startlingly unambiguous on this point, as the tables in Appendix B indicate.

The Metropolitan Area and Low-cost Graduate Work

Even if all local qualified students who desire it were able to gain admission to an adequate and accredited graduate school, many could not take advantage of the opportunity because of the prohibitive cost of such an education in the downstate area. Current newspaper articles, for instance, carry the news that a sister institution in the city will shortly raise its tuition fee to $45.00 per course credit, with other private universities likely to follow suit. When one considers that a recent poll of City College juniors and seniors found that only eleven per cent of those responding would be free from financing problems while roughly eighty-nine per cent would be called on to earn by their own efforts from 15 to 100 per cent of the cost of their graduate training, it is easy to see that many qualified young people might be unable to defray the costs of higher learning.

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[*] Oscar Janowsky, "Inquiry and Report in Preparation of a Program of Graduate Studies," The City College of New York, February, 1951.

[**] George Gropper and Robert Fitzpatrick, Who Goes to Graduate School (American Institute for Research), Pittsburgh, 1959.

For residents of New York State, which lacks a fully operating state university at the graduate level, the problem is thorny indeed. The high cost of tuition at the private universities is a major obstacle for persons of low income or with heavy personal obligations. At the present time schools in New York City make approximately the following charges for graduate tuition.

	Yearly Tuition Full-Time	Per credit
Columbia University	$1200.	$40.
New York University	1200.	40.
Fordham University		
Non-science	900.	30.
Science	1050.	35.
St. John's University		
Non-science	900.	30.
Science	960.	32.
Yeshiva University	900.	30.
New School	680. (Max.)	30.
Polytechnic Inst. of Bklyn.	1200.	42.50

These charges are increasing rapidly and probably will soon exceed even these figures by significant amounts. Moreover, the New York City resident cannot avoid these high charges by enrolling in an out-of-town school, for at the latter his overall expense will in most cases still be higher.

Another problem of graduate study is the great length of time ordinarily taken to complete the Ph.D. Professor Hans Rosenhaupt, in the following table,* arranges thirteen large departments at Columbia University according to the percentage of Ph.D.'s produced by 1956 among students who entered the University between 1940 and 1956:

Department	Ph.D.'s (in per cent)	Average time (in years)
Chemistry	28.0	5.3
Geology	25.0	6.6
Religion	19.0	5.4
Psychology	15.0	5.5
Physics	14.0	7.0
Philosophy	10.0	7.4
French	10.0	9.7
History	7.0	9.5
Economics	6.0	8.8
Public Law	5.0	8.1
Sociology	5.0	10.1
English	3.3	10.1
Mathematics	3.0	7.4

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* Hans Rosenhaupt, Graduate Students' Experience at Columbia University 1940-56, Columbia University Press, 1958.

A long time of study is not unique to Columbia University, as shown below:

	Pure Science		Political Science		Humanities	
	Harvard 1950-54	Columbia 1940-56	Harvard 1950-54	Columbia 1940-56	Harvard 1950-54	Columbia 1940-56
2 years or less	4	5	1	2	1	3
3 years	18	14	7	4	8	4
4 years	40	19	27	10	14	8
5 years	22	18	20	11	19	9
6 years	5	14	17	12	19	10
7 years	4	9	8	10	6	10
8-10 years	3	12	6	24	12	25
over 10 years	4	7	14	27	21	31
	100	98	100	100	100	100

These data include part-time as well as full-time students.

Finally, many graduate students must support themselves, at the high cost of living in New York City, as well as pay tuition fees. Even though the student living with his family may not have to pay for his room and part of his board, he must still provide his books and supplies, as well as his clothing, and all the other items of urban living. His family, which has already supported him through his undergraduate years, often cannot continue such support through the long additional period of Ph.D. study. Also if the young man or woman has acquired a family of his own, the costs of full-time graduate study are frequently prohibitive. Such aspiring students must therefore work at remunerative jobs and carry on their studies on a part-time basis. While this may not be the most rapid or the most desirable pattern of graduate study, it is for many the only alternative to abandoning professional aims altogether; and it offers one of the main sources of training for the additional teachers and scientists our country requires.

It would therefore seem essential that low-cost graduate programs be available in the New York metropolitan area, with many courses in the late afternoon and evening hours. Thus, students, released of the necessity of earning the money for the heavy fees charged by the private universities, can devote a greater portion of their efforts to their studies.

We have been concerned thus far with the need for graduate training in general and with the need for it in New York. It may be profitable as a corollary to this investigation to examine the needs and the wishes of a large sampling of students who received their undergraduate education at The City College, with respect to advanced training at their Alma Mater. Information for such a study is offered in the "Report on the City College's Alumni Census of 1956," which takes into account the responses of 9,791 alumni.

This report showed that 42.8% of our alumni went on to obtain additional degrees of some sort. Among male graduates, 44.7% had additional degrees: 7.6% had a second baccalaureate; 23.4% had been awarded Master's degrees; 13.7% had obtained doctorates (including medical degrees). Another way of viewing the impressive record of our alumni is to chart their progress, using the highest degree awarded as the basis of our table, as follows: The highest degree awarded in percentages:

	Arts & Science	Technology	Education	Business
Additional Baccalaureate	9.6	1.7	2.1	7.2
Master's	23.8	29.2	46.8	13.5
Doctorate	24.6	3.0	5.1	1.0

It is significant that responses from thousands of such degree-holders previously graduated from The City College leaned heavily toward the idea of taking graduate training here. Actually, 19.3% had received some graduate instruction at the college. Thirty-one per cent said they would have taken it if it had been available. Only 36.2% said that they would not have taken some postgraduate training here. The following table is similarly informative:

Question: Would you have taken postgraduate education at CCNY?

	Arts & Science	Technology	Education	Business
I did	15.3%	17.0%	49.2%	19.7%
Yes	38.2	25.8	22.4	24.3
No	32.8	46.1	18.5	40.5
No answer	13.7	11.1	9.9	15.5

The findings of Professor Oscar Janowsky, cited earlier in this report, also indicate that undergraduates at the college share the willingness of alumni to return for graduate degrees:

Question: If graduate work were offered at The City College of Liberal Arts and Science, would you plan to attend?

	If free	If moderate fees were charged
Would attend	75.4%	71.1%
Would not attend	21.3	22.8
Don't know	3.3	6.1

The fact that undergraduate and graduate respondents of a college whose alumni have excelled in higher academic pursuits look with favor upon the opportunity to receive advanced training at The City College should be afforded the consideration that it merits.

That city authorities are aware of the demand of citizens for education beyond the Bachelor's degree is clear from the recent report of Gustave Rosenberg, Chairman of the Board of Higher Education.[*] Reporting that in 1956 there were 5,088 matriculants for graduate degrees in the city colleges, Mr. Rosenberg writes: "Here again we fulfill another real community need, for low-cost graduate work helps meet the requirements of many a potential scholar or scientist who would not otherwise be able to continue his studies." He goes on to say that the Board of Higher Educaton has tried to get foundation help for a survey of the "areas of graduate study as now offered by the private and public colleges and universities of New York City." In a sense, this Task Force partially fulfills that mission.

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[*] Gustave Rosenberg, "As We Face the Future," (May, 1955-57).

[**] By 1960-61, the number of matriculated candidates for the Master's degree in all of the municipal colleges has reached 7583 with 3270 at City College alone.

The National Need for College Teachers

Though many of the problems faced by this Task Force required for their solution some degree of uncertain projection, assumption of future conditions, and just plain guesses, on the matter of present and anticipated need for increasingly large numbers of college teachers in all disciplines no doubt was possible. Even the most budget-minded planner cannot deny the existence of a serious shortage of qualified, graduate-school-trained personnel to teach the added hundreds of thousands of teachable young people who are now crowding, and for a generation will continue to crowd, college admissions offices. An exhaustive report of the Research Division of the National Education Association indicates that the supply of college teachers falls far short of the demand, and that each year the situation is becoming more critical.*

Such findings demand further mention here. Based upon replies to a questionnaire received from 938 (87.2% of colleges and universities polled) institutions, the first distressing finding was that the average new entering teacher is more poorly prepared for the job than was so in past years. Nor is the situation improving with time. For instance: in 1953-54, in all types of degree-granting institutions, 40.5% of the total staff had earned a Doctor's degree and only 10.4% had less than a Master's degree. Since that time, however:

		Level of Preparation	
	Year	**% having Doctor's degree**	**% having less than Master's degree**
New teachers	1953-54	31.4	18.2
	1954-55	28.4	19.3
	1955-56	26.7	20.1
	1956-57	23.5	23.1
	1957-58	25.3	21.8
	1958-59	23.8	20.8

To make matters worse, some of the fields most affected are just those in which there is the greatest national need. For example, the field of mathematics:

	Year	**% having Ph.D.**	**% having less than Master's degree**
New teachers	1953-54	34.2	8.3
	1954-55	29.3	13.0
	1955-56	27.3	18.8
	1956-57	20.5	27.0
	1957-58	20.7	20.9
	1958-59	20.0	20.6

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* "Teacher Supply and Demand in Universities, Colleges and Junior Colleges 1957-58 and 1958-59," a publication of the Research Division of the NEA, 1201 Sixteenth Street, N.W., Washington, D.C., (1959).

That the problem is very pressing and immediate is indicated by the fact that 762 out of 914 institutions reporting noted a real and specific shortage on their own campuses during the academic years 1957-58 and 1958-59.

It is neither possible nor advisable, furthermore, to attempt to close the gap by offering part-time employment to individuals whose primary interests lie outside the university. Our own experience and that of the NEA report discourage use of this expedient. "In the main," says the report, "part-time teachers work with students at the freshman and sophomore levels where classes are largest and the students are least mature—least ready to assume personal unguided responsibility," And later, ". . . evidence is lacking that the educational progress of students taught by a good many part-time teachers is appropriately safeguarded."

Acting to compound a very serious state of affairs still further are two additional factors: the inclination of industry to employ college-trained personnel who in the past were invariably channelled into teaching, and the disinclination of college teachers now serving with less than maximum academic preparation to improve their qualifications by taking leaves for further advanced study. With respect to the latter consideration, 938 insituations questioned by the NEA research group reported only 3.8% of the full-time teaching staff on leave for any reason—and of these, more than four out of ten were on leave for reasons other than advanced study. With respect to the encroachment of industry on the pool of available prospective teachers, the evidence is alarmingly conclusive. Candidates granted doctorates in certain crucial disciplines during the years 1956-57 and 1957-1958 entered *new occupations* as follows:

Field	% Entered Educational Service	% Entered non-Educational Service
Chemistry	29.6	70.4
Physics	45.7	54.3
Mathematics	67.0	33.0
Engineering	33.3	66.7

As black as the picture may be at present, most reliable predictions envisage a much blacker future for colleges and universities unless drastic ameliorating measures are introduced. For instance, basing its forecast on estimated growth of school population, realistic student-teacher ratios, and the like, the NEA report shows the future need to be as follows:

Field	Total number of new, full-time teachers needed, 1959-70 inclusive
Agriculture	15,250
Biological Sciences	20,450
Business and Commerce	18,050
Education	26,000
Engineering	24,300
English	28,800
Fine Arts (all)	37,450
Music	← { 17,700
Speech and Dramatics	9,350
Others	10,400

Foreign Languages	18,050
Health Sciences (excluding dentistry & medicine)	12,850
Home Economics	8,300
Industrial and Vocational Arts	8,300
Library Science	7,300
Mathematics	13,850
Philosophy	4,850
Physical and Health Education	18,400
Physical Sciences (all)	28,100
Chemistry	13,200
Physics	9,000
Others	5,900
Psychology	8,650
Religion	4,850
Social Sciences (all)	37,800
History	11,800
Economics	8,650
Political Science	5,900
Sociology	5,900
Others	5,550
Others	5,200
All fields	346,800

These figures allow for little argument. They are factual, and, unless one is prepared to say that the fraction of the growing population going to college will suddenly decrease, or that teaching methods will be revolutionized, the statistics given here can be considered a fairly reliable prediction.

By themselves, however, the figures are not meaningful. They must be compared with statistics on the contemplated production of Ph.D.'s in this country. But let us make a few estimates of our own before quoting others. Let us assume first that the rate of production of doctorates will remain as it was during the seven-year-period: 1950-56. During that time, 56,064 doctorates were awarded in all disciplines.[*] This means an average annual production of Ph.D's of 8,010. It follows that if all of these recipients of doctorates entered the profession of education (an assumption very far from the truth), even then there would be produced during the 1959-70 period only 88,110—or less than one-third of the number of qualified teachers required.

We should record, in tabular form, this critical shortage of college teaching personnel in specific disciplines. (See table on p. 26).

Thus, it would seem that the major shortages will be in business and commerce, engineering, mathematics, and the physical sciences. Let us consider the statistics governing these disciplines:

Field	Ph.D. Produc. 1950-56	Ph.D. annual rate of Produc.	Ph.D. Produc. 1959-70	% entering Educ. services	(Approx.) Available Ph.D. for Educational services, 1959-70	Teachers needed 1959-70
Chemistry	7,160	1,023	12,276	15.8	1,940	13,200
Physics	3,482	497	5,964	26.6	1,590	9,000
Mathematics	1,524	218	2,616	56.1	1,470	13,850
Engineering	3,973	568	6,816	30.2	2,060	24,300[†]
Business and Commerce—Figures not available.						

[†] A Ph.D. is not always required for professors of engineering, business and commerce.

[*] "Doctorate Production in the U.S. Universities, 1936-56," National Research Council Publication 582; (See table on page 29).

"Teacher Supply and Demand in Universities, Colleges, and Junior Colleges 1957-58 and 1958-59," Research Report (1955)—RIO, Research Division, NEA.

Number of institutions reporting shortage of qualified teachers by field, in 1957-58 and 1958-59.

Field								Nonpublic colleges (by enrollment):		
	All institutions[a]	State universities	Nonpublic Universities	Municipal Universities	Land-grant Colleges	State Colleges	Teachers Colleges	1,000 and over	500-999	Under 500
1	2	3	4	5	6	7	8	9	10	11
Agriculture	12	8	....	....	10	1	....	....	....	....
Biological Sciences[b]	74	4	12	1	7	6	2	9	19	18
Business & Commerce	144	21	13	7	17	33	5	17	22	21
Education	109	7	9	1	7	31	21	8	11	19
Engineering	138	40	21	6	38	31	....	16	4	5
English	83	3	6	....	7	19	12	8	19	11
Fine Arts	50	7	3	....	8	6	3	2	7	20
Foreign Languages	61	7	9	....	5	1	5	7	9	21
Geography	8	2	....	....	2	3	2	1	....	....
Health Sciences[b]	50	15	7	1	11	6	2	8	3	6
Home Economics	74	15	1	1	7	25	10	9	5	6
Industrial and vocational arts	20	2	2	....	3	10	4	1	....	....
Journalism	2	....	....	....	....	....	....	1	....	1
Law	8	7	1	....	5	....	....	....	....	....
Library science	39	2	5	....	2	5	9	....	7	11
Mathematics	424	47	44	9	45	84	36	51	64	65
Philosophy	7	....	1	....	....	1	1	1	3	....
Physical and health education	77	3	1	....	3	23	13	7	10	18
Physical sciences[c]	465	45	47	7	39	86	28	67	82	84
Psychology	70	7	7	2	3	8	8	8	15	15
Religion	18	1	3	....	....	....	....	....	2	12
Sciences (Not specified)	114	9	6	....	11	19	28	7	13	27
Social sciences	131	5	21	2	8	20	11	18	34	15
Other fields	1	....	1	....	....	....	....	....	....	....
Most fields	1	....	1	....	....	....	....	....	....	....
Fields not indicated	5	....	3	....	1	....	....	....	1	1
Number of institutions reporting shortages in one or more teaching fields	762	68	76	12	61	119	70	90	128	171
Number of institutions reporting no shortages in any teaching field	152	2	12	0	4	5	11	7	25	89
Number of institutions reporting	914	70	88	12	65	124	81	97	153	260

[a] Includes 34 state universities and 2 nonpublic universities which are also land-grant colleges.

[b] Does not include dentistry and medicine.

[c] See also sciences (not specified).

A glance at the last two columns of the last table tells a great deal. It confirms the plight of our college appointments committees in the above fields whose members tell us that the shortage is a reality now—that they are currently having trouble securing new and qualified teachers.

In *The Education of College Teachers*, the trustees of the Carnegie Foundation for the Advancement of Teaching supplement the NEA report by taking into account the increased rate of production of Ph.D.'s in the years immediately ahead:

> The intensity of the discussion today stems from the acute need for more college teachers. In 1956, the National Science Foundation estimated full-time (or equivalent) faculty at 196,000. The Foundation estimates that by 1970 this figure will rise to 490,000 if we succeed in keeping pace with our needs. In the period between now and 1970 we must not only find enough new teachers to cover enrollment increases, but must replace all present college faculty who retire or move on to different fields. Considering these added burdens, it is possible that the total new faculty to be recruited by 1970 would be between 300,000 and 400,000.
>
> How many new college teachers will actually be trained between now and 1970? Dael Wolfe predicted that 135,000 Ph.D.'s, only half of whom would enter college teaching, would be produced between 1954 and 1970. The Association of Graduate Schools has estimated 235,537 for the same period. The latter prediction comes within reaching distance of estimated needs and would be encouraging if it were not for the fact that in the past quarter century only 60 to 70 per cent of the Ph.D.'s from leading universities became college teachers. And most present-day observers believe this percentage will drop in the face of vigorous recruiting efforts from government and industry. That means that there will be a sharp decline in the proportion of college faculty members holding the Ph.D. One authoritative source predicted a decline from the current 41 per cent to about 20 per cent by 1970.*

This Task Force is convinced that there will be an acute shortage of teachers by 1970 in almost all, but not all academic areas—especially in mathematics, physics, chemistry, economics, engineering, business, and commerce. The vision which colleges like our own bring to bear on the problem and its solution will undoubtedly determine the severity of the shortage and the relative damage to the intellectual resources of this country, this state, and this city.

It is to be regretted that, country-wide, we have not done enough to prevent the probable shortage. For example, salaries have been increased, but according to studies made by the McGraw-Hill Publishing Company,** the real income or purchasing power of the average faculty member decreased by 5% during the years 1940 to 1954 while the real income of lawyers increased by 10%, industrial workers increased by 48% and physicians by 80%.

An even more recent study which also documents the above was made by the Committee on Economic Status of the Profession in the American Association of University Professors *Bulletin*, March, 1960. It shows that between 1939 and 1960 the relative purchasing power of the college teacher has improved but little. Its figures, based upon a comparison of the salaries at 33 relatively large, well-known and representative institutions, are to be found in Appendix C.

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* After the report of the Task Force was written but before it was released, Dr. Bernard Berelson published a book entitled **Graduate Education in the United States.** He is not nearly as pessimistic about the supply of new Ph.D.'s between now and 1970 as were most previous investigators of the subject. If press releases about the book are correct, the disagreement between the National Education Association report and others and this book is due to different basic assumptions: the rate of production of Ph.D.'s, the necessary student-teacher ratio, the desirability of using Ph.D.'s as teachers in two year colleges, and the like.

**Financing Higher Education, 1960-70, McGraw-Hill Book Co. Inc., 1959.

The municipal colleges and their administrators can be proud of the fact that the salaries paid to regular staff members are relatively high (see pages 46 through 47 of this report).

The Community Need for Additional Facilities for Graduate Study

We at City College are particularly sensitive to the needs and desires of our students, and, being educators, we are also acutely aware of the growing need for trained teachers to replace those who retire or leave the schools for other positions. We are concerned too with the educational structure. These needs have, therefore, been discussed first, in the previous sections. There remain, however, other and possibly even greater needs to be met: the need of the country, state and city governments, as well as of industry, for students having some graduate training.

When we plan a graduate school and a graduate curriculum, we should bear in mind that in most subject matter fields, at least as many students are now being trained for community service through industry and government activities as for teaching in our educational system. This is shown by the report, "Teacher Supply and Demand in Universities, Colleges and Junior Colleges 1957-58 and 1958-59," (National Education Association Research Report, 1959-r10, p. 45.) "What percentages of all Doctor's degree graduates contribute to the instructional program, either as a continuation in such service or as new entrants?" In the key fields, here is the answer: English 86.2%; foreign languages 82.3%; history 75.8%; business and commerce (accounting) 70.3%; mathematics 56.1%; biological sciences 42.1%; engineering 30.2%; physics 26.6%; psychology 26.5%; chemistry 15.8%; *per cent all fields* 44.5%. Another way of saying the same thing is to state that the largest employers of Ph.D's are the federal government and such industrial companies as Dupont, International Business Machines, General Electric Company, rather than schools, colleges and universities.

We are all aware of the fact that during the past few decades great industries and defense plants have come into being which did not exist previously. They require the services of very highly trained men. Most of them have created positions for persons having a training secured only by earning Master's and Doctor's degrees. In other words, the graduate school is becoming increasingly important to this and to every other community in ways which are not connected with the teaching profession.

This is also shown by the data in the "Occupational Outlook Handbook," 1959 edition, of the United States Department of Labor, pp. 20-22. It shows the growing percentage of all workers who are "professionals":

Year	Per cent
1910	4.7
1920	5.4
1930	6.8
1940	7.5
1950	8.6

> Professional, technical and related workers have been, since 1950, the fastest growing of all the occupational groups, moving ahead even of clerical workers. Employment in the professional technical group, which worked 6.5 million in 1957, is expected to continue its spectacular growth in the 1960 decade. The managerial and sales groups will also have substantial employment increases in the 1960's.

The students themselves realize the importance of graduate training to their careers. This is shown by the fact that "career objectives" were by far the most compelling reason for students going to graduate school (49%).[*]

The trend of the country towards a higher level of education is also shown by the number of advanced earned degrees granted by our schools in this country:[**]

Year	Master's degree	Doctorates
1939-40	26,731	3290
1941-42	24,648	3497
1943-44	13,414	2305
1945-46	19,207	1966
1947-48	42,449	3989
1948-49	50,763	5050
1949-50	58,219	6633
1950-51	65,132	7338
1951-52	63,587	7683
1952-53	61,023	8309
1953-54	56,823	8996
1954-55	58,204	8840
1955-56	59,294	8903
1956-57	61,955	8756
1957-58	65,614	8942

That employers are demanding increased training is shown by the appended letter, only one of many sources of information presenting essentially the same position. (See Appendix D.)

This Task Force feels that there is little necessity of documenting further the needs of the community for persons having advanced training. It feels that every educated person would grant that the need is increasing. Rather, its function was to find out where the greatest needs lie.

In order to do this the Task Force communicated with the New York State Department of Labor, the Department of Labor and Industry of the State of New Jersey, the United States Department of Labor, and the employment offices of several local colleges and universities. While the group did not obtain as much pertinent statistical data as it would have liked, it did come away from the interviews with the information that it could serve the community best by increasing graduate offerings in the following fields as soon as possible:

1. Mathematics (particularly applied mathematics, statistics and applications of mechanical computers).
2. Physical sciences (particularly physics and chemistry).
3. Psychology.

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[*] Gropper and Fitzpatrick, **Who Goes to Graduate School?**

[**] "Earned Degrees Conferred by Higher Educational Institutes, 1957-58," United States Department of Health, Education and Welfare, Office of Education, circular, No. 570.

4. Economics and business subjects.
5. Some engineering fields.
6. Life sciences.

The feeling of these agencies that these six areas are the most critical is confirmed at least partially by the table in the previous section entitled "Number of institutions reporting shortage of qualified teachers by field." If industry is experiencing a shortage of qualified persons in certain areas, it is only reasonable to expect the schools and universities to experience somewhat similar shortages.

Mr. John Andrews of the Brooklyn Polytechnic Institute provides some enlightening statistics. The need for men trained in physical sciences and engineering is shown by the fact that during the months of November through May, 1959, 230 companies applied for men having such training, through his employment office. The openings were for:

B.S. in Engineering	10,169 openings
Master's degrees	2,689 "
Doctor's degrees	2,373 "

It would take almost the entire annual production of Ph.D.'s in the United States in the fields covered to meet the above requests for men with Doctor's degrees.

The City College would seem to be most nearly prepared for doctoral programs in subjects such as history and philosophy (if for no other reason than that these departments have the space for such work). Yet it would seem that the community shortages would be best relieved by starting doctoral programs in the sciences and business subjects. Such a procedure would require, at least, new buildings and equipment.

C. ULTIMATE OBJECTIVES

The ideal graduate schools which one should strive for are not quickly attainable. Their growth involves not only the acquisition of new faculty members, new facilities for research, and the like, but also the full realization by the teaching staffs, the administrators, and others in positions of authority, of the basic requirements of good graduate schools.

The diffusion of knowledge through teaching, research, and publication requires that the student body be furnished with:

1. A suitable program of courses and proper research guidance.
2. An erudite faculty having an understanding of and the ability to present advanced subject matter. The presentation should obviously include the most recent ideas in the several disciplines.
3. A sympathetic faculty which is approachable. Time and energy should be devoted to molding the potential teachers and scholars as persons.
4. The physical facilities for effective study and research. These include adequate libraries, conference rooms, and work shops or laboratories, as well as classrooms.
5. A school which students can afford to attend. For most of our students this means low-tuition costs and many scholarships and assistantships.
6. A school with a deserved reputation for excellence of scholarship.

To furnish these things to the student, the faculty needs:

1. The time to do the research and carry on the teaching functions. This involves a proper teaching-load and a revision of the policy governing sabbatical leaves.
2. Adequate office and research space.
3. An adequate library and sufficient basic equipment with provision for acquiring any special apparatus for research as needed.
4. The proper incentives. This involves the maintenance of salary scales and other benefits at least comparable with those existing at other graduate schools, and, if possible, with those in industry.
5. An effective supporting staff.

To satisfy the needs of the student body and faculty, the schools need:

1. A suitable administrative structure.
2. An administrative personnel having a thorough appreciation of the problems connected with the teaching of graduate students and doing meaningful research.
3. The proper financial support. This is possibly the greatest necessity of all.

Each of these needs will now be discussed at some length. We refuse to take the attitude that since it will be costly to meet the needs, they therefore cannot be met. A delay in the starting of Master's and doctoral programs in some fields or a continuance of practices that fall short of the above ideals can be tolerated only as a temporary expedient. The needs of the community and the nation, outlined previously, demand that good low-cost graduate programs be available to the youth of this area. It is our duty to do everything in our power to fulfill these hopes.

CHAPTER TWO

SHAPING THE FUTURE

A. RECRUITMENT OF GRADUATE SCHOOL PERSONNEL

A full-scale graduate school at The City College will undoubtedly depend very heavily for its staff upon the already existing faculty pool at the college. We have shown elsewhere in this report that an excellent nucleus for such a staff is already committed to a career on this campus and that many faculty members are even now fruitfully engaged in graduate teaching and research. Moreover, if it should be found advisable to offer a graduate program jointly with the faculties of the other municipal colleges, a considerable percentage of the necessary graduate school personnel will be available on the spot to launch an impressively respectable graduate school effort.

But time, mortality, and the peculiar needs of this or that department or this or that research project, will demand alertness and ingenuity in replenishing the teaching staff of the graduate school. As we have shown in this study, competent faculty members are hard to come by in this time of critical shortage for the colleges; outstanding men, such as the school would want to attract for positions in graduate teaching and research, are not easily enlisted in the competitive university personnel market. What can The City College do to identify and then to attract such high-calibre faculty?

First, we should like to point out that the problem is nation-wide. This conclusion is inescapable from a perusal of a recent report on the subject: *College and University Faculties: Recent Personnel and Instructional Practices.*[*] Seeking to determine what one hundred thirty-nine universities were doing to meet the teacher shortage, the United States Office of Education questioned the schools regarding their recruitment and allied practices. (See table on p. 33.)

It will be noted that far and away the most frequently used method of attracting faculty members is by employment at higher salaries than have hitherto been paid by the university. The importance of such an inducement to prospective employees in any area—and particularly in areas of critical shortages, such as the sciences, mathematics, engineering, and business—needs no special emphasis in this report. And where a fixed

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[*] The survey was conducted by Clarence B. Lindquist, Bulletin No. 27, U.S. Department of Health, Education, and Welfare, 1959.

Institutions following specified practices in 1957-58 for any reasons and because of faculty shortages, by type of institution: Number and per cent.

PRACTICE	Universities (139)				Liberal Arts Colleges (670)				Teachers Colleges (174)				Junior Colleges (376)			
	Institutions following practice				Institutions following practice				Institutions following practice				Institutions following practice			
	For any reasons		Due to faculty shortages		For any reasons		Due to faculty shortages		For any reasons		Due to faculty shortages		For any reasons		Due to faculty shortages	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
1 Employment of retired persons ..	84	61.3	63	46.0	321	51.3	242	38.7	37	22.7	32	19.6	102	29.1	73	20.8
2 Employment of part-time persons	101	75.9	62	46.6	446	71.5	258	41.3	70	42.7	51	31.1	197	57.6	100	29.2
3 Interinstitutional sharing	45	33.8	15	11.3	239	39.3	136	22.4	33	21.0	13	8.3	127	38.0	53	15.9
4 Employment of less-qualified personnel	69	52.3	66	50.0	290	46.3	274	43.7	94	57.0	88	53.3	159	45.0	148	41.9
5 Employment at higher salaries ..	114	85.7	100	75.2	454	72.4	379	60.4	100	61.3	90	55.2	138	39.8	129	37.2
6 Employment at higher ranks	54	41.2	48	36.6	156	26.4	135	22.8	43	27.6	39	25.0	36	11.1	27	8.4
7 Employment at higher ranks and salaries	66	48.9	61	45.2	229	39.1	194	33.2	51	33.3	49	32.0	46	14.6	33	10.5
8 Accelerated promotions	47	36.2	39	30.0	159	27.7	109	19.0	47	31.5	37	24.8	46	15.2	26	8.6
9 Employment beyond retirement age	67	50.4	45	33.8	287	47.7	190	31.6	40	24.4	29	17.7	82	24.8	56	16.9
10 Retirement age raised	7	5.4	5	3.8	55	9.8	37	6.6	19	12.1	15	9.6	25	7.9	23	7.3
11 New or increased fringe benefits	103	79.2	33	25.4	440	72.5	171	28.2	68	43.9	28	18.1	150	44.8	68	20.3
12 Salary increase of at least 5 percent	116	89.2	58	44.6	560	89.6	270	43.2	131	83.4	76	48.4	279	82.5	140	41.4
13 Lecture sections enlarged	84	62.7	69	51.5	270	44.1	199	32.5	99	60.0	78	47.3	144	41.5	81	23.3
14 Duplicate and overlapping courses reduced	93	69.9	48	36.1	427	71.4	181	30.3	93	60.4	44	28.6	124	37.9	54	16.5
15 More student responsibility for learning	54	40.9	29	22.0	276	46.8	100	16.9	58	37.7	29	18.8	70	21.7	22	6.8
16 Nonprofessional assistants used	61	45.5	37	27.6	235	39.2	154	25.7	55	34.6	36	22.6	85	25.0	39	11.5
17 Number of smaller classes reduced	83	61.5	58	43.0	370	61.0	215	35.4	103	67.3	67	43.8	166	50.2	84	25.4
18 Programs eliminated, curtailed, postponed	69	52.3	36	27.3	320	52.6	185	30.4	81	50.0	49	30.2	159	47.0	76	22.5
19 Subcollegiate courses reduced in number	58	45.3	24	18.8	146	25.8	60	10.6	33	21.7	21	13.8	46	14.3	22	6.8
20 Courses completely or primarily by TV	35	26.7	11	8.4	23	3.9	4	.7	10	6.5	2	1.3	12	3.5	3	.9
21 Courses completely or primarily by films	7	5.4	3	2.3	13	2.2	3	.5	6	3.8	1	.6	5	1.5	3	.9

Lindquist Report, pp. 24 and 25.

salary schedule may prevent dramatic alteration in a teacher's pay from term to term or department to department—as it often does at The City College—many schools, including our own, have found it necessary to employ faculty at higher ranks (for the same education, age, and experience) than would normally be so without the shortage emergency.

A perusal of the table reproduced above shows that the unfortunate aspects of a find-the-manpower-to-cover-the-classes-at-any-cost policy are also present. The knowledge that almost half of the universities questioned found it necessary to employ part-time personnel, not because of the special skills or knowledge that these persons possessed but simply because they were the only recruits available is sobering. The information that the same number of universities had to take advantage of retired persons to round out their staffs is similarly significant. In neither instance are the long-run needs of the schools in question being catered to; in neither case is the future of the institutions any less shaky than if no additional faculty members had been recruited to make up the deficiency. Nothing fruitful may be said concerning the practice of hiring less qualified personnel, enlarging classes, or desperately cutting educational corners in a short-term survival program. The universities need good young instructors and researchers now if they are to maintain their reputations in the future. Such men and women are obtainable only if they are trained for their jobs in sufficient numbers so that recruitment to college employment follows as a matter of natural course.

Many schools are beginning to cultivate more aggressive recruitment policies and practices. The Lindquist report mentions such devices as widening contacts with college and university placement bureaus, hiring of new staff members earlier than usual in the year in order to anticipate bids of competing universities, making it simpler financially for a prospective faculty member to come to the new campus for an interview, and planning ahead by several years, with prospective teachers lined up more than a term in advance. Such practices are undoubtedly helpful on a small scale, but that they can greatly alleviate the pressure on university administrations is extremely doubtful. Widely adopted, they merely intensify the competitive struggle.

A more hopeful sign of intelligent steps toward recruitment is the recent encouragement, practical and otherwise, given to prospective faculty members while they are in the process of completing their graduate training. Some schools actually subsidize the graduate training of selected young men and women, with the understanding that those chosen will spend at least several years after graduate school teaching at the supporting institution. In some instances, such students are selected while attending the college as undergraduates. Some subsidize graduate study of new staff members during summer sessions in return for a pledge of continued tenure on the faculty when such training is completed. Several schools, especially the larger ones, maintain a staff of graduate assistants, who are helped to complete their education and at the same time are scrutinized as possible permanent additions to the faculty.

As The City College is at present organized, not all of these practices would be feasible. Besides, the college has attractions, such as its cosmopolitan location and its high-calibre student body, for young faculty members in search of a permanent berth. On the other hand, it has the disadvantages, discussed at length elsewhere in this report, of heavy teaching-loads for all members of the staff—those engaged in research and graduate study as well as those carrying only an undergraduate teaching schedule—and a glaring lack of facilities (laboratories, office space, equipment, etc.) for carrying on advanced instruction and investigation in scholarly areas.

This Task Force believes that the college will have to work diligently and effectively to remove the serious bars to recruitment mentioned here, *by all the means at its command:* administrative, financial, fraternal (by appeals to the alumni), and even political. It must enlist the support of every citizen who would give more than lip service to the concept of providing public higher education at a crucial time in this nation's history.

In addition, it must define as precisely as possible the kind of graduate school it wants, and then, deliberately and positively, it must supplement its present pool of graduate school, or potential graduate school, faculty members by the addition of distinguished scholars and younger men and women whose shorter records of achievement give promise of future distinguished careers in teaching and scholarship. This means shaping the program of teaching hours, the salary schedule, and the working environment to fit the kind of personnel appointed. It means, too, revaluation of present staff members with a view toward singling out those whose interests and accomplishments make them likely candidates for broadened careers in the graduate school, with whatever attendant responsibilities and rewards the new classification entails.

The task will not be easy. And it will fail unless concern for the future outweighs considerations of the present. The need to attract the best must take precedence over sentimental attachment to things as they are. Expediency must surrender to principle.

It should be said here that The City College has, during the past two years, advanced encouragingly in the matter of recruitment. This is especially true of the program on campus sponsored by the Carnegie Corporation of New York. Administered by Assistant Dean Middlebrook, it offers a summer training program for specially gifted graduate students, both our own former undergraduates and those from other colleges. The young embryo college teachers are paid to teach a full summer program here, but they actually teach only half time. In the remainder of the time, they meet in seminar and privately with supervisors to discuss their classes, their teaching, their subjects, and the educational process. In this way, certainly, many recruits to the teaching profession are kept from wavering before the financial blandishments of higher salaries in other fields. Simultaneously, we raise the level of teaching of new faculty members. And finally, we create the good will for and the appreciation of this college that may shortly influence these gifted people to return as permanent members of the staff—the kind of faculty we want eventually for our graduate program.

The School of Technology has long followed the practice of employing recent graduates from our and other institutions as full-time lecturers at rates of pay double those of the more lucrative fellowships. These young people are given minimum teaching duties and encouraged and enabled to pursue doctoral studies during the academic year and summers. Some of these people have found this path feasible to eventual full time college teaching. A number of departments in the liberal arts college likewise employ young people who are completing their graduate studies as tutors or lecturers.

B. THE WORK-LOAD

Like those who teach undergraduate courses, a staff member teaching graduate courses must stay abreast of his own field in addition to carrying on his own research and also overseeing the investigations of others, giving lectures, and possibly performing some administrative duties as well. Without doubt many staff members can serve in such capacities with distinction if adequate time is allowed for the task. This is testified to by the remarkable research record of The City College—remarkable for an essentially undergraduate institution in which, in all probability, a staff member carries a somewhat heavier than average undergraduate teaching-load.

Heavy teaching-loads handicap the research activities and the intellectual growth of the faculty. We are happy to report that many staff members, college administrators, and Board of Higher Education members, particularly those on a committee under the direction of Dr. Arleigh B. Williamson, are trying to correct these shortcomings. The information to follow may possibly prove of value to them.

The Task Force first sought to determine how many hours of actual effort are needed to discharge conscientiously the 15 hour undergraduate teaching obligations normally required of City College staff members. There exists a good deal of information on the subject. The first such study to be cited and probably the one most applicable to The City College staff is a by-product of a questionnaire circulated by Dean Morton Gottschall and Professor John C. Thirlwall at The City College during the month of December, 1956. A carefully selected group of 26 representative teachers from the schools of Education, Liberal Arts, Business, and Technology were asked to outline a "typically desirable weekly distribution of time." Their answers included time for research, but if we omit the time to be spent on research and community activities, we have an estimate of the time needed to discharge the teaching obligation.

A composite picture of the results follows:

Activity	**Average Hours Per Week**
In class	11.7
Preparing examination material	1.1
Course preparation	9.5
Grading papers	3.6
Counseling (office hours)	2.9
Committee work	2.3
Total hours, exclusive of research	31.1 Hours

or a ratio of $\frac{31.1}{11.7} = 2.7$ hours per hour of class teaching.

It should be emphasized that the twenty-six men selected because of efficiency and reliability were probably unaware that they were also giving data from which the factor of work hours per hour of teaching could be extracted.

A more direct estimate of this factor can be obtained from the publication "Analysis of Instructional Program, Fall Semester 1958," published by the University of Nevada. In it the college President presents to the State Legislature the following typical work week of an instructor doing no research:

	Preparation, study, analysis, etc. Hours.	Student instruction periods; classrooms, laboratories or workshops. Hours.	Grading tests, reports, filing marks, etc. Hours.	Student counseling (office hours, etc.). Hours.	Committe work and general services. Hours.	Research in own field. Hours.	Total hours.
Lectures only	12	12	12	4	4	0	44
Laboratory only	9	18	9	4	4	0	44

This results in the following factors:

For lectures only $\frac{44}{12} = 3.7$ hours of work per class hour.

For laboratory only $\frac{44}{18} = 2.5$ hours of work per class hour.

Many of our staff members do some laboratory work but are in the main classroom teachers. For such teachers the University of Nevada Study would seem to indicate some factor between the two given above—perhaps 3.4 would be applicable.

Similar conclusions come from still another source—*A Memo to a College Trustee,* by Beardsley Ruml and Donald H. Morrison (page 11, section 2):

> The number of hours spent on the average by members of the faculty in direct teaching of students in formal groups is an essential figure in the calculation of a college teaching program. In part 3 of this Report a figure of 9 hours a week is taken for three of the models and 9⅜ hours for the fourth. The basis for these figures is that they conform to prevailing ideas of good practice and seem to make sense in that they give some 27 hours out of a 36-hour working week for the members of the faculty to prepare for direct instruction, to read student tests and papers and to meet a fair burden of student appointments. It must be remembered that this schedule applies for about 33 weeks of a year, and that major commitments of time for research should be provided by a research budget, not squeezed out of the teaching budget. It must also be remembered that a 36-hour working week is not excessive, and that other hours are available for reading, writing and conversation with colleagues.

These figures give the factor $\frac{27}{9} = 3$ hours of work per hour in class.

It would appear, then, that a factor of three is approximately correct. If this is so, it would seem that the current "fifteen-hour teaching schedule," as practiced in many departments of the college, places a very heavy burden on any conscientious staff member trying to do research. It means that such a person is working $15 \times 3 = 45$ hours a week, on material connected with the courses taught. Hours for research must, therefore, come from what a normal individual regards as his hours of leisure or else may be taken from time normally allotted to the problems of the student or, in some cases, from both.

The factor: $$\frac{\text{actual hours spent (connected with course work)}}{\text{scheduled class hours}} = 3$$
is not a perfect measure of the effort expanded per scheduled class hour. Much depends, too, on the calibre of students, the subject matter, and, of course, on the class size. All these variables determine the amount of advance work that must be done by the teacher. Furthermore, in addition to the added hours of preparation needed for a large class, other factors also vary with class size. The larger the class the more "quiz" papers to mark, the more "term papers" to be read, the more student questions to be answered during "office hours," and the like. In other words, doubling the class size and reducing to one-half a professor's number of scheduled hours would certainly not reduce his work-load to one-half of that previously carried.

To take this factor into account, many schools list work-loads in terms of student credit hours (SCH) instead of scheduled class hours. The number of "student credit hours" for a course is the product of the (number of students in the class) × (credit value of the course). For example: a course meeting five times a week (carrying 5 credits) and having an enrollment of 30 students would have a weight of $5 \times 30 = 150$ student credit hours (SCH). Some midwestern and western undergraduate schools seem to regard an average of 250 SCH per term or 500 SCH per academic year as about the "normal" load for a non-laboratory instructor, and 200 student credit hours for laboratory subjects. This is shown to be the case, for example, in "Analysis of Instructional Program, Fall Semester, 1958," University of Nevada and elsewhere. One of the more extensive surveys corroborating this truth is the statistical report of the California state colleges (1957-58), Part E, "Faculty and Instructional Summary." This report covers all the state colleges in the state of California, employing 2,991 full-time and 665 part-time teachers or a total of 3,197.47 "full-time effective" teachers. During the spring semester of 1958 the average student credit hour load per instructor was 227.5.

Another such study was made by the state of Michigan. Most public and private colleges in the state were surveyed with the following result.

The average *yearly* student credit hour load per teacher:

	Lower Division	Upper Division	Graduate Division	Average all Divisions
Private colleges	660.6	443.2	261.2	567.3
Public colleges	594.7	449.4	210.1	482.7

Or the average student credit hour load per semester per full-time effective teacher was:

Public	241.4
Private	283.7

The above taken from "Staff Study, No. 6," "The Survey of Higher Education in Michigan," March, 1958, p. 154.

This measure of work-load has to be varied somewhat as different subjects are considered. Either of the above measures of work-load (scheduled hours or student credit hours) may give a false picture when used by itself, but if both are applied simultaneously, a fairly accurate picture of an instructor's teaching-load results.

The work-load of a professor engaged in research and/or teaching graduate courses should be evaluated in a somewhat different manner, a point which this report develops in a later section (see pp. 41-44).

In the past, in some fields at The City College, the "continuous growth and publication" requirement for the promotion of a staff member has been interpreted quite liberally. In fact, it had to be. Most natural science departments have no research facilities and the staff members have very heavy teaching loads.

As an example, consider a typical mathematics program:

Course	Class hrs.	Credits	Students	Student credit hrs.
Mathematics 7	5	5	30	150
" 2	4	3	30	90
" 115	3	3	30	90
" 113	3	3	30	90
Total	15	14	120	420

The teacher has a nominal work-load of 15 × 3 = 45 hours. This estimate is probably low, for he has a large number of papers to mark. The 420 student credit hours are almost twice the "normal load" of 250 student credit hours, which is the criterion of many schools. Such a staff member is certainly in no position to compete with the research professor at a large institution whose three to six-hour teaching-load will be concerned almost exclusively with material pertinent to his research activities. When one considers the heavy teaching-loads at The City College, the general record of research activity here seems remarkable. In fact, the research records of some staff members can be considered outstanding examples of what can be accomplished by singleness of purpose under heavy handicaps.

Heavy teaching-loads which are comparable with our own and a lack of the other necessities for research probably account for the poor research records of 807 small colleges and universities surveyed by the National Science Foundation.*

Number of persons	15,691
Full-time equivalents	14,249
Faculty engaged in research	1,395
Full-time equivalents engaged in research	275
Research time as per cent of total time	2%

If we were content to regard The City College as a purely undergraduate institution whose emphasis is almost exclusively on the teaching of undergraduate students, the present teaching-load of 15 class hours per week does not appear to be unique.

In this regard we may cite only one of several available studies.

The following data were given in a report entitled "39 Teachers Colleges in the Midwest, Instructional Load, 1958-59," published by Bureau of Research and Examination Services, Iowa State Teachers College, Cedar Falls, Iowa. It was a study of the present "status" and was not designed to establish standards at these teachers colleges:

Averages for full-time teachers:

Assignment	Credit hrs.	Contact hrs.	No. of courses per term	Student credit hrs. per term
Full-time teaching (no lab.)	13.91	14.68	3.26	395
Full-time teaching (with lab.)	12.48	17.85	3.33	305

These teaching-loads are probably somewhat heavier than those at most undergraduate schools. Average practice is probably more nearly given by the report of the California State Department of Education "Faculty and Instructional Summary 1957-58, Part E: A Statistical Report of 15 California State Colleges." The schools covered are mainly undergraduate institutions accommodating a total of 52,310 equivalent full-time students and employing 3,707 teachers (2,991 on a full-time basis)

The median teacher load — 11 hours
Range of variation — 0 to 38 hours

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* "Scientific Research and Development, Colleges and Universities Expenditures and Manpower, 1953-54," National Science Foundation Publication #59-10.

Distribution of full-time teachers by units of teaching credit

Units of credits	Total for all colleges	
	Number	Percent
0 - 3	144	4.8
4 - 7.9	430	14.4
9 - 11.9	1,118	37.4
12 - 15.9	1,225	41.9
16 and over	74	2.5

These data possibly explain the poor research records of 807 small colleges and universities surveyed by the National Science Foundation, for even the median teaching-load of the California study requires 11 × 3 = 33 hours of effort on the part of the instructor.

Summary:

The time required to discharge the teaching function is approximately three times the number of weekly class hours. Conscientiously to teach the present nominal undergraduate schedule of 15 weekly class hours requires about 45 hours per week of a staff member's time. If a school desires meaningful research to be carried on by the teaching staff, the above factor must be used realistically and the teaching schedules must be adjusted so as to allow for adequate research time.

Teaching-Load at Leading Graduate Schools

To what extent do faculty members at first-rate undergraduate and graduate schools engage in research activities, and what are their teaching-loads? The National Science Foundation Publication #59-10, quoted previously, also made a survey of 180 such schools. They are the major institutions of this country and are those which consequently award most of the earned Ph.D. degrees. They show an impressive picture of faculty research activity. In these schools the number of science faculty engaged in research and development is as follows:

Number of persons	43,573
Full-time equivalent	38,331
Faculty engaged in research	27,073
Full-time equivalents engaged in research	13,694
Research time as per cent of total time	35.4%

Thus it becomes clear that if The City College alters its position from an essentially undergraduate school to a graduate-undergraduate structure, there must be a substantial reallocation of the faculty work-load. Though it may be that the graduate faculty must work harder than its undergraduate counterpart, it will have fewer scheduled class hours per week. Such an allocation is standard practice in reputable institutions.

To determine the policies in effect at the great private and public universities, the Task Force sent a questionnaire to fifty-one of the greatest "graduate-undergraduate" schools. They included the thirty greatest producers of Ph.D.'s in the United States as well as other schools known to be fine research centers. These thirty greatest schools grant over 70% of all the Ph.D. degrees earned. The fifty-one schools selected probably grant about 80% of all earned doctoral degrees. Of these fifty-one schools, twenty-eight are definitely public institutions, and several others are supported in part by public funds. (See Appendix E for questionnaire.) Fourteen of the schools solicited did not reply.

Many of the schools seemed reluctant to answer the questions posed in brief form because of their desire to present a full picture. Many institutions, therefore, attached an explanatory letter to the questionnaire which often was more informative than a completed questionnaire. Several of these are so characteristic of all of the replies, that one of them is reproduced here:

> The young members of our teaching staff usually give two undergraduate courses (six hours per week throughout the year) and a graduate course for one or two terms (two hours per week). The staff members at the full professorial level in general teach two courses, one an advanced undergraduate course (three hours per week throughout the year) and a graduate course (two hours per week throughout the year). In addition, all staff members are likely to attend their departmental seminar (two hours per week throughout the year)—no particular preparation is necessary for such seminars.
>
> To state the amount of time devoted by faculty members to research is an impossibility. By the large, every man of the staff works all day and into the night on his research—and for most of us, it is a seven-day week that we put in. Of course, the faculty member is not carrying on research while he is in the classroom, and I certainly would not mean to imply that no one engages in 'extra curricular activities.' It is really impossible to give you any realistic figures for the time that our staff members put into research.

Some of the schools were not in a position to answer the questions as posed, but gave the average teaching load as a function of academic rank. One of the great public universities listed among other items the existing average weekly teaching load in the following manner:

Professors	8.5 hours / week
Associate professors	9.5 hours / week
Assistant professors	10.9 hours / week
Instructors	10.8 hours / week

A summary of the gist of replies received would include such pertinent information as the following:

1. Most of them required some research activity on the part of almost all staff members. Teaching schedules are consequently adjusted realistically to allow for such endeavors.
2. Few teachers have as many as twelve scheduled class hours. Those who do are not expected to participate in research activities.
3. Faculty members actively engaged in research seldom have more than nine scheduled class hours, six to eight being a more likely program.
4. If a staff member is expected to guide doctoral candidates, the teaching-load is almost never higher than nine hours per week, a program of from three to six hours weekly being more common.

A separate study was made of the normal teaching assignments at business schools. Twenty of the best known such schools were canvassed and seventeen replies were received. Surprisingly enough, the results were almost the same as those already given for other types of schools.

Conclusions:

> That the universities in which research activity is high have realistic teaching schedules which allow time for research.
>
> That the basic scheduled undergraduate teaching-load at this College should be no higher than twelve hours per week, as it is according to the minimum standards of all major state universities. Although it would not approach the very small teaching programs of the great universities, adopting such a policy would ensure The City College a much more favorable bargaining position in recruiting a competent faculty for the graduate and research program. Should the College continue to use the fifteen-hour teaching schedule as a base, it will not be able to compete with the better graduate schools.
>
> That graduate courses should be equated to undergraduate offerings on approximately a 1.5 to 1 basis. Under such a scheme, a staff member who taught only graduate courses (a plan that we do not recommend) would have, theoretically, a normal teaching-load of eight to nine hours.
>
> That these be considered basic load measurements. Since they require approximately thirty-six hours of effort on the part of the instructor, additional special duty assignments should bring the staff member concerned equitable schedule allowances.
>
> Such services as student guidance, thesis supervision, supervision of honors students, and sponsored research activity ought to be so compensated. On the other hand, ordinary committee assignments within the department, regular office or conference hours, and the like, are to be considered part of the general teaching-load.
>
> That additional teaching allowance be made for those faculty members who, in the opinion of college authorities, will do effective scholarly research. As a general principle, prospective research projects will have to be evaluated by a departmental research committee as to feasibility and promise. This committee will then determine the time to be allowed for this purpose. Under such a plan, for instance, a man teaching nine hours per week would have a work-load of 3 x 9=27 hours per week and would thus be able to devote the equivalent of at least two days per week to research duties.
>
> The Task Force realizes that some staff members in the past have found it physically possible to do some research while teaching the equivalent of a fifteen-hour schedule. It recognizes the possibility of a young, ambitious man working fifty-five or more hours per week in productive channels, but it cannot condone such frantic activity as either normal or desirable. Expecting new recruits to the staff in the years to come to operate under such pressure is unrealistic—especially if the College wishes to attract outstanding scholars in a time of teacher shortage.
>
> That the cost to the College of a policy of twelve-hour teaching schedules and allowances for research would not be excessive. Some departments of the College have already achieved this state.*

The problem of work-load has been given a more detailed treatment than most others because an *adequate amount of time for the staff to do research and stay abreast of the field is the most important ingredient in a good graduate school.* While we may be forced to accept less than ideal schedules at first, every effort should be made to attain proper programs as soon as possible. A defeatist attitude on this point is unthinkable if a mediocre graduate school or worse is to be avoided.

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* A detailed chart of the present teaching-load situation at the College is to be found in Appendix F.

Again the Board of Higher Education is demonstrating its foresight. A committee under the leadership of Dr. Arleigh Williamson is now studying the problem of teaching schedule reductions at the municipal colleges.

C. SABBATICAL LEAVES

The necessity for a teacher to keep abreast of his field, particularly if he is expected to do research and teach graduate courses, impels the Task Force to consider the policy of The City College toward sabbatical leaves for study and/or research.

The current policy of The Board of Higher Education of The City of New York with respect to sabbatical leaves is this: if approval is granted for the leave, the staff member receives his regular annual salary minus the salary of his substitute, assuming that the leave is for one-half year; if leave is granted for the full year, the staff member receives half pay for the entire year. In either eventuality, the faculty member normally draws about half his pay during the time of his absence. This policy is particularly discouraging to a prospective applicant for a leave inasmuch as pension, social security, and hospitalization deductions remain the same, despite the reduction in income. In addition, his salary is still subject to taxation, leaving very little take-home pay each month. Finally, if a staff member undertakes advanced study or research at an institution outside of the New York area, he must also pay moving expenses as well as tuition and other fees. It is not difficult, therefore, to understand why the staff has not taken full advantage of the opportunities for advanced study afforded it by sabbatical leaves.

The policy of the Board of Higher Education for half-year leaves is less liberal than that in effect at most four-year undergraduate or graduate schools throughout the country. The usual practice is to grant a one-half-year sabbatical leave for advanced study after every six years of teaching at full pay, or one-year leave at half pay. (See Appendix G).

Recommendations:

That the college stimulate research activities beyond the present levels by adopting a sabbatical leave policy presently in force at most comparable schools. Doing so would enable the staff to devote one-half year to advanced study, without interruption, after every six-year period of teaching—and without incurring financial loss. If granted a full year's leave, the faculty member would receive half pay.

That, under the conditions listed in the recommendation above, the college encourage and expect every faculty member to take his earned leave in order to conduct research projects or to increase his awareness of scholarly advances in his area of specialization.

That staff members on sabbatical be allowed to do industrial or other remunerative work during a full year (half pay) sabbatical leave if it can be shown that such work involves original research or creative endeavor consistent with high professional standards.

D. THE QUESTION OF "ADDITIONAL EMPLOYMENT"

In the peculiar historical development of this college lie the seeds of the present situation with respect to additional employment. The importance that the Evening Session has assumed has made it necessary to staff it with the best available faculty members. These have often been drawn from an immediately accessible pool—the regular day session tenured instructors. Furthermore, it has been possible to secure the services of these men for such additional employment very often because the college did not offer the required physical plant and research facilities to keep such faculty members occupied in scholarly investigations on campus after the classroom day was over. In addition, many members of the staff have found it necessary to supplement their regular incomes by taking additional employment either in the Evening Session of the college or at other universities where more elaborate research facilities might be offered, or in industry. From this or other "outside" consulting work, many teachers have become accustomed to deriving a considerable portion of their annual income. In fact, some of the most distinguished of these are able to remain in the relatively unlucrative profession of college teaching only because of this extra income.

Nor is the problem limited to The City College. The Task Force was told at the United States Office of Education that, in general, the quality of the professor and his value to the university often vary directly with the size of the consulting fees which he earns on the outside. Realizing this, some universities actually encourage such extramural efforts, especially if the research facilities at the institution are somewhat limited. Information from many major universities supports the view of the United States Office. (See Appendix H).

Conclusions and Recommendation:

That some outside employment may benefit staff members both financially and intellectually and should therefore be permitted.

That limitations should be set on the amount of outside employment to be allowed, in order to obviate the danger of shifting the faculty member's center of interest from his regular employment to his "additional" work.

That each request for permission to take on additional work be given individual consideration, within the framework of the pertinent by-law of the Board of Higher Education, appended below:

> That no person rendering full-time service in any of the colleges under the administrative control of the Board of Higher Education shall engage in any other business or profession while in the service of the college unless such business or professional service shall have been approved by the President of the college in which such persons receive such annual salary. Such additional service shall not be permitted, if, in the judgement of the President of the college, such service may interfere with the proper performance of the duties for which the annual compensation is provided.

That, as a rule of thumb, the faculty member be allowed the equivalent of one day per week for the purpose of additional employment. Such an allowance would permit the staff member to augment his salary by twenty-five per cent, thus bringing it further into line with compensation available outside the teaching profession.

That the President and the Review Committee should continue to curb any tendency on the part of a staff member to abuse the privilege of participating in outside work.

E. SALARIES

We have already listed many of the essentials of a good graduate school. Some of these we already possess in full measure—a fine undergraduate student body eager and ready for graduate studies, the nucleus of an outstanding graduate faculty, and a great community need for low-cost graduate schools. To these assets we can add a salary scale for the tenure staff which is competitive with those at all but a few of the great graduate schools. In fact, were salary the only criterion in the competition among educational institutions for a superior faculty, the municipal colleges would be in an especially favorable position.

The salary scale for those teaching in the graduate school on a part-time basis, or as additional employment for regular staff members, leaves something to be desired. The minimum pay for graduate teaching must be $25 an hour or more to be competitive with that of neighboring universities. However, we can not build the solid type of doctoral program that we hope for if more than a small part of our faculty is employed on any such basis. Only the need for an outstanding authority, who has other employment and whose services can not be secured in any other way, or a temporary emergency, can justify the extensive use of part-time teachers.

Compensation for faculty members in universities has been studied extensively by W. Robert Bokelman: *Higher Education Planning and Management Data, 1958-59,* published by the United States Office of Education. The data are classified by types of institution, such as universities, liberal arts colleges, and so on, and subdivided still further by geographic location and type of financial support. The data which were derived from institutions comparable to The City College are to be found in Appendix I. From these we see that for the moment at least we are in quite a favorable position. If we desire to remain so, however, the salary schedule must be re-examined at frequent intervals. The United States Office of Education reported that the salaries of staff members increased as follows:

Years	Per cent increase
1947-54	20%
1954-58	20%
1958-59	7.6%

The June 1960 issue, *Bulletin* of the American Association of University Professors, contains material which is of interest. While perhaps the figures on comparative average salaries at 224 institutions are a bit deceptive since the city colleges do not make as much use of low-paid assistants as do other schools, nevertheless their average salary ranks with the best in the country. The data for the academic year 1959-60 are as yet incomplete. The American Association of University Professors gives a partial listing of salaries in the Winter, 1959, number of its *Bulletin.* (See Appendix J). We must temper our enthusiasm, however, because heavy teaching schedules put us in a somewhat less favorable position. In other words, for the teaching effort expended, The City College salary scale is only a little better than average.

When the competition is broadened to include industry, business, government and other non-educational inroads on resources of teaching manpower, the position of the city colleges is less enviable. In fields like chemistry, physics, business and engineering, this is especially true. While this disproportion is not likely to affect substantially the retention of mature, settled members of the teaching and research staff, it cannot fail to be an important factor for the future, in recruiting able young instructors and in attracting men of stature for positions in our expanded graduate program.

Conclusions and Recommendations:

> That the present salary scale is competitive with those in effect at other institutions, but that excessively heavy teaching loads tend to negate the advantage of a relatively good salary scale.
>
> That the college must re-examine its salary schedule at frequent intervals to ensure a favorable balance in the competition with other universities.
>
> That the college must seek to outbid non-educational institutions in the competition for trained manpower, not in terms of salary (where we are at an insurmountable disadvantage) but in terms of "work-load," physical surroundings, vacations, research equipment, and the general academic atmosphere.

F. THE SPACE PROBLEMS OF THE GRADUATE SCHOOL

Effective teaching and competent research alike require a university environment conducive to intellectual concentration, orderly exchange of views between student and faculty member, wholesome work habits (whether in classroom, laboratory, or private office), and efficient storage of pedagogical equipment. The importance, therefore, of making the requisite space available to faculty members, in order to insure maximum effectiveness professionally, seems clear.

Numerous studies of university space requirements are in substantial agreement on the amount of office space essential to the professor in doing his proper job. One such table of allocation is appended below:

Office space and research area requirements per full-time effective faculty member (For source and tables see Appendix K)

Subject	Office Space	Staff Research Space & Related Services
Arts	160 sq. ft.	100 sq. ft.
Languages & Literature	140 " "	40 " "
Social Sciences	140 " "	40 " "
Biological Sciences	130 " "	250 " "
Physical Sciences	130 " "	250 " "
Engineering	180 " "	300 " "
Mathematics	140 " "	60 " "
Other professions	180 " "	80 " "
Military Sciences	140 " "	40 " "
Physical Education	140 " "	100 " "

Experimentation with the figures offered in this table, and the pooled experience of the members of the Task Force, show the estimates to be realistic, especially if the space is thought of as allowing for the teaching, counseling, and research functions of a staff member.

By these suggested standards, our college falls considerably short of providing adequate space accommodations (see department-by-department survey of space allocation in Appendix L). Occasionally, however, the college has had some success in compensating for this physical handicap. The ingenuity of the staff has resulted in the use of corridors, sidewalks, campus grass, and neighboring restaurants as extensions of (or substitutes for) office space—with no discernible loss of dignity for the staff or of lowered intellectual horizons for the students. But often, such improvisations are difficult, if not manifestly impossible.

The Department of Chemistry is among those that are hard-pressed for space. Office space, in the present arrangement, must be shared by the occupant with stored chemicals, stored apparatus, honors students doing research, laboratory technicians preparing experiments for impending lectures, and the like. The resultant overcrowding is such that some members of the department do not even have a desk to share. The nominal office space allotted to the forty-one members of this department comprises an area of 2236 square feet—or 54.5 square feet per staff member (contrasted to a combined office and research area of 380 feet per faculty member recommended by the study we have cited above). Yet even this figure must be further pared, since the office in question must serve many purposes besides that of providing a post for the staff member. In actuality, when all uses of the rooms are considered, the occupant has only an average of 24.1 square feet which can be regarded as office space—or only 18.5% of the office space recommended by the survey we have mentioned. Five or six times the present office space must be provided.

We may represent the space situation in the experimental sciences in the following tabular form:

THE EXPERIMENTAL SCIENCE DEPARTMENTS (Office space)

Department	"Nominal" office space in sq. ft.	Estimated actual office space in sq. ft.	Number of staff members	Actual sq. ft. of office space per staff member	Per cent Actual office space of recommended office space
Biology	1765	630	28	22.5	17.3%
Chemistry	2236	990	41	24.1	18.5%
Geology	1573	1180	13	90.7	69.8%
Physics	2027	1520	40	38.0	29.2%
Psychology	1129	1129	22	51.4	39.4%

It is clear that if ample space is a factor in effective teaching and research, then the present state of the physical plant in the sciences seriously hinders even undergraduate teaching at The City College. No wonder that the departments affected are unwilling to initiate a program leading to the Ph.D. until the space situation changes markedly!

What has been a space problem in the School of Engineering will soon be eliminated by the use of the new engineering building.

Present office space allocations for the remaining departments on the Uptown campus range from a low of 18.5 square feet per staff member in Romance Languages to the fairly adequate accommodations in Philosophy (109.3 square feet). The following table gives a breakdown of available office space by department:

Department	Sq. Ft. per staff member	Per cent of recommended office area actually allocated
Art (1)	92.9	58
Classics	47.2	34
Drafting (1)	60.5	43
Economics	107.4	77
Education (1)	92.0	51
English	70.9	56
German	48.0	34
Government	91.8	66
History	87.8	63
Mathematics	45.1	32
Music (1)	92.8	66
Philosophy	109.3	78
Romance Languages	18.5	13
Sociology	105.7	76
Speech (1)	60.5	43

The University of California's standards for office space are:

Education	180 sq. ft.
Art	160 sq. ft.
Others in this group	140 sq. ft.

(1) These departments need workrooms or studios in addition to office space. For this reason these departments are more deficient in space than this table would seem to indicate.

At the Baruch School, the problem is complicated by the fact that part-time evening session instructors far outnumber regular daytime staff members. This means that particularly during the evening hours, there is considerable overcrowding of space facilities, making meaningful research activity, especially on the Ph.D. level, very difficult.

Conclusions and Recommendations:

That additional office space should be provided for those departments of the Liberal Arts Division now suffering from overcrowding. Some additional space may be available as a result of the erection of the new Administration Building and the new Engineering Building. Since the adoption of a limited graduate program will not appreciably alter the requirements of office space, it is not expected that major changes in space needs will arise for the engineering departments in the near future.

With respect to office space for faculty members in the experimental sciences, an urgent requisition must be made, not only to satisfy the increased needs of a graduate program, but even to allow for the ordinary undergraduate teaching functions. A certain amount of space may be conserved by the creation of new storage facilities for chemicals and equipment, but it is recognized that this alone will not entirely suffice.

With respect to office space for the staff of the Baruch School, at least all regular day session staff members and any special professors who will guide doctoral candidates should be provided with adequate room. How some of this needed space may be made available will be suggested in recommendations under classroom needs, offered below.

Classroom needs

The first need of an expanded graduate program is classroom space. If, as anticipated, most graduate courses are scheduled for late afternoon and evening, both at the Uptown center and at the Baruch School, an already awkward room situation will be appreciably worsened. A survey by the Registrar during the academic year 1959-60 shows that classroom utilization on the Uptown campus is about 75% of capacity between 4 P.M. and 6 P.M., and at 100%+ from 6 P.M. to 10 P.M., a circumstance that makes necessary the hiring of additional rooms in the nearby High School of Music and Art.

At the Baruch School too, the classrooms are utilized to capacity during the evening hours. Indeed, as of September, 1960, half of the graduate program in business will be offered in a rented building on Twenty-fourth Street at Seventh Avenue. Any future significant expansion of the graduate program in business obviously demands the building of additional classrooms or the renting of outside space, unless other programs at the Baruch School be curtailed to allow for augmentation of graduate offerings.

Conclusions:

That, at least as a short term measure, the Administration consider augmented use of facilities of adjacent educational structures (High School of Music and Art, etc.) to accommodate the classroom overflow for non-laboratory subjects on the graduate level at the Uptown center.

That planning specialists consider the construction of a new Baruch School plant with space set aside for the program of graduate studies.

Laboratory needs

The most serious deficiency in a City College plan for a full-scale graduate program in the experimental sciences is the lack of adequate laboratory research areas. By any recognized standards our science departments are far below minimum levels in the matter of research space. Though a makeshift Master's degree might be offered within present limitations in some of these departments, all department heads in the sciences agree that any talk of the doctorate is premature unless provision is made for new laboratories designed for graduate work.

At the Baruch School, there is similarly a shortage of work space in statistics, management, industrial psychology, and other fields.

Conclusions and Recommendations:

That graduate work in the laboratory sciences be restricted to the Master's degree level, wherever feasible, for the time being.

That the City of New York authorize the construction of a Science Building as soon as possible, in which all laboratory sciences may be effectively housed.

That adequate office space for use of the science faculty and technical staff be incorporated in such a building.

Miscellaneous comments:

As an alternative to the foregoing recommendations concerning space requirements, there should be mentioned the possibility of construction, at some future date, of separate buildings to serve the needs of all divisions and departments except Engineering in the graduate fields. If such buildings were authorized, they would not have to be erected necessarily on any present campus site—but rather central to all. The further possibility exists that they might be planned so as to provide adequate facilities for the graduate needs of all the municipal colleges. In this way, duplication of function with its attendant expense might be avoided.

The most serious objection to this plan is that it would tend to split the faculty and student body into graduate and undergraduate groups. Then many of the reasons for supporting a graduate school would no longer be cogent. The scholastic atmosphere of the undergraduate school and the faculty recruitment problem would certainly not be helped in the same measure as if the facilities were located on the various campuses.

The development of joint programs among two or more of the municipal colleges might meet some of these objections. Graduate instruction offered at each campus, with inter-change of some faculty members where necessary, and with cooperative planning to avoid unnecessary duplication of facilities, might be part of a rational approach to the problem of graduate instruction in the municipal college system.

Nevertheless, the difficulties of travel and the diffusion of effort which this plan involves, as well as the undesirable separation of graduate from undergraduate instruction, suggest that best results will probably come as each of the four-year colleges develops its own inner dynamism at the graduate level, within a rational over-all plan for the entire system. Distinguished faculty members of one institution would thus become available to graduate students of the other municipal colleges, while at the same time retaining their roots in the undergraduate colleges. To some extent, this would also avoid undue overlapping.

G. ADMINISTRATIVE STRUCTURE

The Task Force is mindful of the primary importance placed on the beneficial influence of graduate programs on the undergraduate offerings. Therefore, as elsewhere in this report, the pattern of organization is designed to maintain a close relationship between them. In fact, this is also most practical, since increasing separation of graduate and undergraduate functions only intensifies the difficulties of assembling faculty and facilities for both.

Conclusions and Recommendations:

1. That the faculty of each school of the college should form a Committee on Graduate Studies. The membership of this committee should be formed by election or appointment from the faculty, with the Dean as the chairman.

   This committee would consider graduate curricular offerings and graduate programs proposed by the departments, or by interdepartmental groups or by members of the faculty or administration. This committee would recommend approval or disapproval of these proposals by the faculty. If approved by the faculty, the graduate offerings would be processed in the usual administrative channels for authorization by the Board of Higher Education.

This faculty committee would also consider matters of standards of performance, requirements for award of degrees, and admission requirements, for recommendation to the faculty for approval.

2. That each department form a "Committee on Graduate Studies," the selection of a chairman, the size and membership of the committee, to be decided in each case by the department chairman in conference with the Dean of the school.

   The departmental Committee on Graduate Studies would have the following duties:

   a. Curriculum. The committee would study all course offerings by the department for graduate degree credit. The approval of the committee would be required for all courses and programs to be offered. After committee approval is obtained, the curriculum recommendations would be sent to the Committee on Graduate Studies of the faculty of the appropriate school and thence to the faculty and to the Board of Higher Education through the usual channels.

   b. Standards. The committee would recommend standards of performance and completion of students' work. The committee would recommend standards for matriculation of students for graduate degrees. The committee's recommendations of students for degrees would be sent to the faculty committee of the appropriate school for action and recommendation and thence to the faculty and Board of Higher Education.

   c. Guidance. The departmental committee or its chairman would arrange for faculty members to have conferences with each graduate student so as to assure the final acceptability of the student's program. The committee would arrange for this guidance by its own members or any other members of the department qualified to consider the case of each student.

   d. Personnel. The departmental committee would recommend to the Department Committee on Appointments such persons or personnel standards as may suit the needs of the graduate program. Faculty appointments and promotions would be made in the manner now in operation at the college.

3. That the Dean of each school, or his designated Assistant Dean for Graduate Studies, examine the applications of students for admission to graduate study. Within the policies and practices set or customarily followed by the college and school and in cooperation with the department concerned, the Dean would have the responsibility to accept or reject each applicant. The Dean, in cooperation with the Registrar, would notify the departments of those students who have completed the requirements for degrees. The departmental committee would consider the recommendation of these students to the faculty committee and thence to higher levels.

4. That all operational matters pertaining to documents and records for registration, student records, collection of fees, assignment of rooms, etc., should be placed with the Registrar and Bursar, as is presently done in undergraduate operations.

5. That interdepartmental programs be developed by *ad hoc* committees of these departments. The results of such interdepartmental studies require approval by the proper Departmental Committees on Graduate Studies before submission to the Faculty Committee on Graduate Studies and higher levels for implementation.

6. That development of joint programs among the four city colleges be by agreement between departmental and administrative representatives of The City College and the designees of the other institutions. The Department Committees on Graduate Studies will recommend those courses in other institutions that will be acceptable for credit as well as recommending that certain courses at City College be offered for, or open to, registration by students of the other city colleges.

7. That appropriate arrangements be made for the members of the faculty at any of the four city colleges to teach at any of the others as may be advisable. This

interchange among campuses should be possible within the teacher's regular schedule of assignments and/or as extra duties for extra compensation, as may be decided as a matter of policy.

8. That graduate programs be operated with a minimum creation of new administrative structure and within the existing college faculty and departmental framework. Special purpose institutes or groups for special programs can be administered by agreement of the departmental chairmen concerned and the Dean and the President. The disposition of funds within the department can follow the existing lines of Personnel and Budget committees.
9. That under the President and the respective Deans, the allocation of research time allowances be the province of the department chairman as part of his prerogative and duty of assigning teachers' schedules; the chairman will also handle necessary relations with The City College Research Foundation (see Section H, pp. 76-81) or other sponsors or supporters of research. In this connection he may appoint a committee to advise him.

H. ADMINISTERING RESEARCH

Let us start this section of the report by stating the problems that are left to more suitable coverage elsewhere in this report, namely, provision of space and facilities, allowance of time, and recruitment of personnel. Also, this section does not deal with those areas of research which require no expenditure of funds for the research activity. The problem left is to design a structure for the administrative support of those research activities which depend on financial support in addition to time and facilities.

This structure must deal with problems of procurement, city inspection of equipment, employment of temporary personnel, insurance, taxes, pensions, and so forth. A primary objective is to avoid mingling college regular budget tax funds with other funds received in support of research.

The recommended device is the creation of a "City College Research Foundation." This foundation could be largely patterned after the existing Research Foundation of the State University of New York, a non-profit educational corporation chartered by the New York State Board of Regents. (A copy of the charter of this foundation is to be found in Appendix M.) This form of research administration is common to many large universities.

The Research Foundation is to be completely separate from the City College as a legal entity. However, its Board of Directors is to be composed of persons from the college and from the community. Although it is not important to specify the make-up of the Board at this time, similar organizations usually have the college President as chairman and other college officers and alumni as members.

The Foundation is to have an operating chief or executive director who would serve part time and would be a regular member of the faculty of the school. This composition of Board of Directors and executive Director is designed to ensure operation of the Foundation in a way that is educationally sound and directed toward the basic mission of the college. The Foundation is to have such full-time and part-time business personnel as may be required. The Foundation will also have the services of such faculty advisory committees as the Board of Directors may request from the college.

The Foundation personnel are not civil servants and are employed on a non-tenure basis. However, the Foundation may request the services of certain faculty or other college personnel. These persons do not become Foundation employees, and the college is to receive such reimbursement from the Foundation as may be appropriate.

The main business of the Foundation is to support research. This comes about in many ways, all of which depend on the existence of a creative individual on the faculty to do the research. When a faculty person originates a research proposal (new, or a continuation), he prepares sufficient description of it to obtain from his department chairman a favorable endorsement as to its meritorious nature. Some departments may decide that this endorsement is to come from a department committee and/or the chairman. This proposal is then sent to the City College Research Foundation where the originator is given help as to format and budget. The complete proposal is then submitted to the proper academic dean for approval. The Foundation then submits the proposal to prospective sponsors that have come to the attention of the researcher or the Foundation personnel. The Foundation accumulates information on potential sponsors and particular submission procedures for the guidance of the researcher. The Foundation represents itself as the body that will accept the funds for the research and will act as the accountable fiscal agent. All other funds in support of research at the college that may accrue by procedures other than a researcher's proposal are also received by the Foundation. This achieves the vital separation from the regular college budget tax funds and the cumbersome procedures attached thereto.

With the funds received, the Foundation reimburses the college for the expenses of the research.

The Foundation hires temporary research assistants and technicians and pays for insurance, taxes, contributions to retirement (e.g., F.I.C.A. or T.I.A.A.). These people are hired in specific connection with certain research funds, and no tenure is implied or possible. This method releases the college from personnel obligations. Regular salaries or payments for services to non-college personnel are made directly by the Foundation.

A serious complaint by researchers at the college has been the procurement procedure. The regulations governing New York City funds are not suited to the conducting of research. Research apparatus and supplies procurement are almost always matters of peculiar and special description and frequently are difficult to anticipate very long in advance. Research procurement cannot be bound by the procedures suitable to repetitive procurement of commercial items. The customary quantity purchase methods of a city or college agency are often too cumbersome—resulting in the wastage of research talent through loss of time. The Foundation helps to solve this problem. Procurement under Foundation research funds is to be initiated by the researcher and proceeds through normal departmental approval and thence to the college purchasing office. The college purchasing office places the orders for the Foundation, according to such rules as the Foundation states. For example, direct placement of orders without multiple bidding or allowable limits on petty cash purchases can be in accord with more liberal Foundation rules. With adequate fiscal safeguards, this process can be quite acceptable. It is the practice already in use in the State University of New York.

The following is quoted from a publication of the Research Foundation of the State University of New York:

> Business Officers are not required to procure bids on research equipment items unless the character of the equipment and its customary distribution channels are such that (a) substantial savings will be effected by securing bids and (b) such bids may be secured without substantial loss of time. Purchase orders exceeding $500 for individual items must be transmitted to the Research Foundation for approval before placing with vendor.

The items purchased are received in the usual way by the college but vouchers are forwarded to the Foundation for payment. The Foundation retains title to all apparatus, which is loaned to the researcher for his use. This makes eventual disposal easier by return to the sponsor, donation to the college, scrapping, and so forth.

At this point it may be well to digress to mention the problems of research use of electrical apparatus. Under existing conditions, each electrical item must be inspected by a representative of the City Department of Water Supply, Gas and Electricity before it can be used at the college. This laudable safety procedure causes delays of months and is not suitable for application to highly special research apparatus, not usually within the ken of the City Inspector. Since the Foundation cannot be directly helpful in this case, it seems appropriate that the college break this bottleneck by some means such as the following: arrive at an arrangement whereby those special electrical items intended for research and nonroutine application may be installed and used immediately on receipt, subject to later inspection at the convenience of the City Inspector.

The existence of the Foundation would make the overhead costs of research easier to identify and, therefore, simpler to incorporate in budgets submitted to prospective donors. It is also possible that the Foundation operation would generate income in some instances or be the recipient of other unrestricted funds. These funds could be disbursed in support of research at the college by order of the Board of Directors.

We find precedent for this separate corporate body in support of a college function in the Research Foundation of the State University of New York, Research Foundations of New York State Departments of Health and Department of Mental Hygiene, the New York City Department of Health, the City College Fund, the City College Press, and others.

It is also important to emphasize that the performance of research by regular college personnel as part of their regular duties is a legitimate procedure as approved and encouraged in actions by the Board of Higher Education as well as stated in published standards for promotion at the college. Such assignment to research functions has always been sharply curtailed by budget limitations, but could be expanded if funds were supported through the proposed Research Foundation.

Another area of administrative concern is that of patent rights arising from sponsored research. In this connection, the Foundation should establish general agreements with the college and with college and Foundation personnel to administer all patents for the benefit of the Foundation, to the extent allowed by any patent limitations imposed by the original sponsor. This permits funds generated in this way to be returned to research and even for the further use of particular researchers in some cases. In this connection it is interesting to note that some 58 colleges and universities turn over all their patent rights to be administered by the non-profit "Research Corporation" originally founded by the Cottrell will and established under the laws of the State of New York in 1912.

The City College Research Foundation can act as a fiscal arm not only for the college and the individual researcher, but can do the same with efficiency for such groups or units at the college as wish to form themselves into separate, special purpose "Research Institutes." The special purpose Research Institute has much to recommend it for prestige and professional attraction. The City College Research Foundation could be fiscal agent for such Institutes as well as others in the college without in the least obscuring the fact that the research funds are for use for a particular purpose, or by particular persons or groups.

I. SUPPORTING STAFF

The Task Force has considered the needs of the research staff and graduate faculty at some length. The needs of the supporting staff also require some consideration.

Research work often makes heavy demands upon the knowledge and abilities of a supporting staff. A machinist working on a piece of research equipment should have a good understanding of the function of any piece of apparatus which he is making and the role it plays in the investigation being undertaken. Because of his practical knowledge, he is expected to make suggestions about possible design changes which simplify the problems of fabrication and assembly of special scientific pieces of equipment. In other words, such work certainly requires the most knowledgeable and accurate type of machinist.

The same thing can be said about the supporting secretarial staff. In the subject matter fields, at least, reports are liable to be very technical, and some technical knowledge becomes almost as important as a knowledge of the more usual secretarial duties.

For these reasons it is necessary to have the persons aiding the graduate and research staffs as capable as possible. The employment of such staff members should be tailored to the needs of a specific department group and should be entered upon only after a demonstration of some knowledge of the general field in which they are to be employed. This knowledge is fully as important to a supporting staff member as a knowledge of the conventional secretarial or machinist techniques.

J. INITIATING PROGRAMS

Considering the lack of accommodations and the heavy teaching-loads, the research record of the college is quite good. What follows, therefore, is not a criticism of our present faculty or administration but a recognition of the higher level of accomplishment demanded of a research professor in a full-fledged graduate school.

We feel that the amount of research done at the college by those who will lead the graduate programs should be increased until it is comparable with the level of scholarly activity found in good graduate schools throughout the nation. Doctoral programs undertaken under such circumstances would command universal respect.

The most important ingredient in the success of the above programs, at least for those expected to show leadership, will be teaching schedules which allow adequate time for research and scholarly activities. Adequate space, equipment, and funds for their proper upkeep are also important.

Only when a department has established itself as an active research group should it embark upon a graduate program leading to the Ph.D. degree. To ensure this:

a. Each department aspiring to sponsor Ph.D. candidates eventually should first submit an outline of its proposed programs and fields of research to the appropriate Dean and his graduate committee for revision and suggestions. From time to time, this group may desire to employ outside professional talent to aid it in its deliberations.

b. All departments which will be expected to carry graduate programs through the Ph.D. should be allowed from 3 to 8 years of operation with adequate space and with the normal graduate school teaching schedules for leaders of the program, to establish their research activities.

c. When the Dean of a school and his graduate committee decide that one of the departments has shown by research and publication that it is ready for Ph.D. students, they should apply to the President for a review of the department's proposal for such a program. The President should follow the practice of many good schools by engaging a "visiting committee" of distinguished research men and teachers in the field to work with the department's graduate committee. The visiting group should be drawn from the great universities but not from the neighboring institutions of the community. This committee should interview the research professors who will guide the research activities. Such men have in effect been subsidized with light programs to enable them to establish research reputations, and they should expect their accomplishments to be reviewed periodically. The visiting group will also review the proposed graduate program and make suggestions for changes based upon their extensive experience. Finally, they should submit a confidential report to the President and the Deans to guide their subsequent actions. It is clearly impossible for this committee or, for that matter, any committee other than one composed of disinterested specialists in a field to judge the worth of a graduate program. It requires specialists to judge whether the work of another specialist constitutes really original research of a meaningful sort. This Task Force feels that it would be presumptuous for it to pass on the technical merits or usefulness of a program in a specific field suggested by specialists in that area of activity.

d. The students allowed to become candidates for the Ph.D. degree should be a carefully selected group. The cost of such an education is high and can certainly not be borne entirely by the student. A major justification for such a program is that the intellectual growth of the school requires it. The school should not attempt a large doctoral program until the state or other fiscal agency recognizes the necessity of providing adequate and continuing financial support.

K. A SPECIAL POST-MASTER'S PROGRAM FOR THE CITY COLLEGE?

With colleges and junior colleges, technical institutes and special professional schools being created throughout the country, to the accompaniment of a growing teacher shortage in higher education, attention is being directed more and more critically toward the traditional doctoral degrees. The kind of application necessary to obtain such degrees, the time entailed, the type of dissertation, have all been subject to scrutiny by those who are entrusted with the task of relieving the shortage and improving postgraduate education.

At the City College, new possibilities are being explored. The School of Education has been planning Sixth Year Programs leading to certificates in Educational specialities like school psychology, remedial education, and educational administration. These are not necessarily tied in with a doctorate although some students may ultimately seek the degree. The development of Sixth Year Programs in Education is in line with a trend that is evident in outstanding institutions across the country.

Among other plans that have been suggested as means of ensuring the needed teachers without drastic dilution of the quality of their education is the one which may be called the "Pre-doctoral certificate program." It would, in brief, allow a graduate student possessing a Master's degree to go on with further course work to the extent of about thirty additional credits —the normal credit accumulation of the Ph.D. candidate. Part of this credit load would involve courses in teaching of the subject matter in which the student was majoring. Upon completion of the regulation sixty credits beyond the Bachelor's degree, the candidate would be expected to write a dissertation designed to prove his mastery of a large body of subject matter in his specialization. When this written work was approved, after a three-year stint of study and writing, the candidate would be granted a degree that would fall beyond the Master's but short of the traditional Doctor's degree.

The merits and demerits of such a plan are not easy to evaluate, especially when one is forced to weigh them in the abstract, without recourse to a specifically detailed departmental plan. Nor is the decision simple to arrive at unless the extent of the urgency to train college teachers in this or that discipline be stated. The Task Force has, therefore, been able to arrive at no "answer" during long hours of deliberation. It has, however, been partially successful in at least enumerating the disadvantages and the advantages of the general idea.

Assuming a genuine teacher shortage in many disciplines, and assuming that numerous young people would be willing to enter the college teaching profession if the academic training beyond the Master's degree were not so time consuming, narrow in specialization, and uncertain in terms of finding an original subject for research and carrying through the project to a successful completion, the plan seems advantageous to both student and institution. For the former, there is a specific target date on which he may confidently expect to begin teaching. There is a manageable body of literature that must be dealt with in his dissertation, so the danger of taking on too much or too little, as may happen with research projects, is obviated. In addition, the acquisition of this intermediate degree would in no way unduly hinder properly qualified students from continuing on, in their own time and at their own speed, toward the formal Ph.D. or other type of doctorate.

For the institution that must secure the services of many young instructors in order to establish proper age relationships in its various departments and that must, practically speaking, keep its basic courses covered by trained teachers, such an intermediate degree might solve many personnel problems. This is especially true of institutions which do not claim regular four-year liberal arts status. For junior colleges and the like, such trained personnel, equipped well beyond the Master's training but with less than the traditional doctorate, might be an ideal compromise.

On the debit side, several objections ought to be noted. No matter how euphemistically stated, there is little question that this scheme represents a dilution of the established Ph.D. degree. It calls for a large corps of teachers whose training is substantially inferior in rigor to the training hitherto demanded of college instructors. And though this objection may be weakened by the argument that partly prepared candidates are better than none at all, still the specter of the "cheap" doctorate will not disappear. There is, therefore, the concomitant question of the acceptance by college administrations of holders of the proposed degree. Can it be said with any certainty, for instance, that The City College or any other first rate institutions of higher education will accept such prospective staff members? The doubtfulness of such a situation makes it difficult to urge, with confidence, the undertaking of such a special training program.

There are, furthermore, difficulties implicit in the naming of the degree so as not to confuse it with the traditional doctorate, now hallowed in academic corridors.

The problem has no easy solution. It does deserve, however, extensive and intensive discussion among the faculty and administration of this college. The Task Force commends this appropriate deliberation to readers of this report. (See Appendix N for an account of special graduate programs in other colleges)

CHAPTER THREE

PAYING FOR THE FUTURE

A. INTRODUCTORY CONSIDERATIONS

The success of doctoral and research programs at the college depends, in the first analysis, on one necessary condition: namely, funds which might enable the programs to begin and to continue. One of the most serious and difficult tasks which confronts this Task Force, therefore, is to recommend sources of financial support.

Clearly, the group itself could not undertake to engage in any action toward the raising of money. Our duty was, therefore, to suggest to those who administer college affairs and to the various audiences which our report will reach, what the sources of funds might be and on what financial basis graduate study and research should rest. We cannot truthfully say that we have discovered exciting and hitherto untapped sources of wealth. We have attempted rather to examine the known methods of financing a university and to suggest ways in which these might be applied to the present problem.

The need of the community for low [illegible] post-graduate educational opportunities of high calibre, the need of the nation for professional personnel, and the need of the teaching profession for replenishment make it imperative that the city colleges should increase their graduate offerings. Yet even if these needs were not so pressing, the well-being of the colleges themselves requires as much support as possible for graduate activity. Without it, it will become increasingly difficult to recruit new faculty members of stature—men and women who insist upon research opportunities at their college of residence. Without research and graduate studies, indeed, the future intellectual climate at undergraduate institutions may well be such that a talented student body fails to receive the academic stimulation that it deserves.

The Task Force therefore considers it essential to support the best graduate programs within the resources of the city colleges. The scope and strength of these schools will be functions of the financial support given them by the city and the state. In the past, the municipal colleges have operated successful graduate programs on the Master's level (and in some few cases beyond). These achievements are especially heartening because they were accomplished in the face of great handicaps. The charter of The City College, for instance, mandates financial support only for undergraduate education. The graduate divisions of several schools of The City

College have been forced to pay for their own direct operating expenses out of student funds. (For detailed statements of the present status of the several graduate programs now in operation, see Appendix P).

There is no doubt that, at the Master's level, our schools can continue to operate as successfully as they have in the past. It is also clear that many new Master's programs might be instituted in departments where they do not at present exist. But this Task Force has been asked to determine whether the institution can expand its services to include research and graduate instruction at the doctoral level; and, if it can, what material resources would be necessary to achieve the goal.

No one answer to these questions can be given. Much depends on the disciplines considered and the calibre of the doctoral program envisioned. It is conceivable, for instance, that doctoral programs might be handled by the Baruch School and by the School of Engineering in much the same way as the Master's program is now being managed. If a sufficiently large enrollment were secured and higher fees charged, the fees of the students might effectively cover the direct costs of classroom instruction. The federal government and local industries might sponsor research projects, particularly of the "applied" type. In this way the cost to the college of the thesis research might be kept within acceptable bounds, a pattern of organization not without some precedent.

The College of Liberal Arts and Science might experience greater difficulty in following this line of financing, first because anticipated enrollments in many departments are smaller and, secondly, because research sponsors might be harder to obtain. The School of Education, on the other hand, enjoys a state subsidy that might possibly be extended.

The pattern of support by government and industry mentioned above is certainly less than ideal. Under it, the research budget of the institution would depend, among other considerations, upon the whims of Congress and the economic health of business—manifestly an unstable foundation for academic progress. If minimum class sizes were to be required before an advanced graduate course could be offered, the student would not even have the assurance that he could complete the required course work within a reasonable time, if at all. To rely on such support to carry on a graduate program would be frustrating at best.

Conclusions and Recommendations:

That the college should act cautiously when initiating doctoral programs which rely upon student fees to meet the direct costs of formal instruction and which depend upon industrial and federally sponsored projects to pay for the associated research. This is particularly so if much use is to be made of part-time employees and of regular staff members working on an extra compensation basis. It would be adopting a defeatist attitude not in keeping with our past accomplishments if we were to tolerate such a situation for more than a temporary interim period even though it may be absolutely necessary, pending a more stable arrangement.

This college has overcome weighty obstacles during a century of constant expansion. In that time it has grown from little more than a secondary school to the outstanding institution it is today. We are confident that means will be found to continue its growth. For the time being, there are possibilities of embarking on limited doctoral programs in several areas.

B. SOME GENERAL FACTS ABOUT THE FINANCIAL SUPPORT OF GRADUATE SCHOOLS

The experience of other publicly controlled universities might serve as a guide to those seeking the necessary funds, and to those charged with their most effective allocation. Unfortunately, it is virtually impossible to discover what sums are allocated specifically by these institutions to graduate studies. Respondents from many public universities indicate that undergraduate and graduate funds are not normally distinguished, either by the university budgeting systems or in the legislative appropriations. Rather, university funds and personnel are allocated by the school according to its needs.

The relative magnitudes of funds from various sources for publicly controlled universities are shown by the following data which include the most recent complete statistics:

Publicly controlled universities			Per cent of	
Sources of income	Number of institutions	Amount reported (in thousands)	Educational & general income	Total current income
Educational & General:				
Student fees	81	135,359	11.7	9.6
Federal Government:				
Veteran's tuition & fees	81	3,334	.3	.2
Land-grant institutions	49	69,004	6.0	4.9
Research	73	145,952	12.6	10.4
Other purposes	73	6,741	.5	.4
State Governments:	81	582,005	50.3	41.5
Local Governments:	21	30,051	2.6	2.1
Endowment Earnings:	71	13,752	1.2	1.0
Private Gifts and Grants:	72	44,137	3.8	3.2
Related Activities:	74	98,656	8.5	7.0
Other Educational & General:	80	29,719	2.5	2.1
Total	81	1,157,710	100.0	82.4
Auxiliary enterprises	81	235,666	—	16.9
Student-aid income	74	10,567	—	.7
Total current income	81	1,403,943	—	100.0

Source: Badger and Rice, **Statistics of Higher Education, Receipts, Expenditures and Property, 1955-56**, United States Department of Health, Education and Welfare, (Printed in 1959).

Another useful table issued by the United States Office of Education, on March 9, 1960, showing the allocation of the expenditures of all types of institutions by purpose during the years 1955-56 and 1957-58, is reprinted below:

(Amounts in thousands of dollars)

Purpose	Amount 1955-56	Amount 1957-58[1]	Percentage increase[2]
Educational and general expenditures:			
General administration and general expense	$ 358,380	$ 478,166	33.4
Instruction	1,148,510	1,477,350	28.6
Extension and public services	141,074	178,928	26.8
Libraries	86,133	110,510	28.3
Physical plant operation and maintenance	326,259	408,938	25.3
Organized research	506,098	733,887	45.0
Related activities	222,345	238,924	10.8
Sales and services expenditures		7,439	
Total educational & general	$2,788,799	$3,634,142	30.3
Auxiliary enterprise expenditures	639,721	778,034	21.6
Student-aid expenditures	96,224	131,386	35.5

[1] Advance data.

[2] Based on unrounded figures.

The first of these tables shows that for the academic year 1955-56, the major sources of support of publicly controlled universities were:

State and Local Governments	52.9%
Federal Government (all sources)	19.4%
Student Fees	11.7%
All other sources (including endowments earnings, private gifts and grants, related activities and other general income)	16.0%
Total	100.0%

The second of these tables shows something of very great importance to our hoped for research and doctoral programs. In the average institution of higher education during the academic year 1957-58, for every dollar spent on instruction, about fifty cents was spent for organized research and about eight cents was allocated to the library. In the present academic year (1959-60), in institutions supporting graduate schools of recognized merit, the portion of the total receipts allocated to research and libraries was without doubt much greater. Yet The City College budget itself contains no provision for research support.

The City College Fund alone gives some financial aid to research. However, welcome as it is, the total annual budget would be incapable of supporting a single average research project in one of the natural sciences.

The above data show the financial problem clearly. The student body, the staff, the alumni, and college administrators must work together to secure the normal financial backing for graduate and research work from public funds sufficient to support doctoral programs of distinction at the municipal colleges. To expect to finance a graduate school of reasonable size and merit by means of student fees and federal grants, without draining off some of the support of the undergraduate school, is, at best, courting mediocrity. To reduce costs initially, it may be expedient to operate small doctoral programs with a faculty heavily supplemented with part-time instructors having other full-time employment. Additional assistance may be obtained temporarily from the undergraduate school by appropriate budgetary interchange. However, continuing operation on any such basis is unthinkable if we envisage a graduate school of recognized merit.

To aid our administrators and others of vision to secure the necessary monies, the Task Force has studied the sources of funds at other publicly controlled schools. A digest of our findings follows.

C. SOURCES OF FUNDS

State and Local:

As shown in the introduction to this and the following sections, other publicly controlled universities rely upon state and local governments for the major portion of their support (52.9%). The state budgets of most of them hardly distinguish between the undergraduate and graduate divisions. The funds and personnel are distributed according to the needs of the academic community.

The Task Force was inevitably driven to the realization that The City College must also place primary reliance on public resources. A later section of this report will show that other sources of financial aid such as federal, industrial, and foundation research support of the types that are desirable ultimately depend, in large measure, upon the existence of proper physical facilities and teaching schedules that allow for active faculty participation in research. If student fees are to remain reasonable and if a questionable reliance on many part-time employees and others not having the graduate school as a major interest is to be avoided, then the state or local government must grant relatively as much financial support for research and graduate studies as is customary in other states.

A partial listing of the per capita expenditures for higher education by selected states during the academic year 1955-56 is interesting:

Total and Per Capita Expenditures by selected States for Higher Education. 1955-56

State	Receipts for current funds (thousands of dollars)	Per capita (dollars)
California	106,882	8.24
Michigan	58,405	7.94
Illinois	57,658	6.19
Texas	50,797	5.79
New York	**43,230**	**2.73**
Pennsylvania	31,705	2.92
Ohio	29,870	3.33
Indiana	29,614	6.83
Louisiana	27,398	6.28
Washington	26,980	10.31
Iowa	25,233	9.30
Minnesota	23,974	7.52
Florida	22,946	6.28
Wisconsin	21,412	5.78

Adapted from Henry G. Badger *et al, Biennial Survey of Education in the United States—1954-1956*, Statistics of Higher Education, 1955-1956, "Receipts, Expenditures and Property," Chapter 4, Section 11, pp. 24 and 92.

While the recent aid given to the municipal colleges by the state may put New York State in a somewhat more favorable light, the support given to graduate work and research, particularly in the liberal arts, has been far less than that given by other states to their publicly supported institutions. Research support in this state has been mainly devoted to agriculture, forestry and industrial labor relations. Even when these fields are included, however, the total expenditures for research are not consistent with the wealth and resources within the state.

Expenditures for Conduct of Research and Development in Six State Universities—Fiscal Year 1954

State	Amount spent (thousands of dollars)
California	10,725
Wisconsin	2,280
North Carolina	1,586
New York	**1,405**
Connecticut	467
New Mexico	319

Adapted from National Science Foundation, "Scientific Activities in Six State Governments," NSF 58-24, (1958).

Conclusion:

> An effort should be made by all concerned to convince the state authorities that support must be given to graduate instruction and research in the arts and sciences and in the professional areas in which we are now active. The development and support of such programs at The City College, with its century-old tradition of scholarship, its demonstrated production of scholars and researchers in the past, and its already existing graduate endeavors, would seem a completely logical step. Such a development appears to be a relatively inexpensive way for New York State to begin the inevitable process of pulling itself abreast of other comparable states.

Federal Support:

The second largest source of income for publicly controlled universities is the federal government (19.4%), most of the support going toward sponsored scientific research, basic and applied. The potential for such activities at the College is very high. If teaching schedules and laboratories adequate to maintain continuous research materialize, a doctoral program can be confidently initiated in the sciences. Several government investigators expressed as their personal opinion and belief that the New York municipal colleges constitute one of the largest almost untapped pools of competent research talent in the country.

Lesser financial aid is given by the federal government to researchers in other than science and engineering, namely in economics, business, social work, and public administration. They are, however, in the main, "applied" projects which usually amount to a farming-out of a specific problem to specialists who happen to be located in a university. Some financial aid is also given to universities for reasons other than research, but the potential is not now great. For example, if the municipal colleges had doctoral programs in operation, they would be given a sum not in excess of $2,500 for each National Defense Graduate Fellow enrolled (Public Law 85-864). However, since an effort is made to distribute the fellowships throughout the nation, no institution can expect more than a relatively small number of such students.

Federally sponsored scientific research is either of the basic or applied type and is supported either through a grant or in project form. The funds often do not cover the actual cost of the research, particularly if it is of the basic type, for at least two reasons: (1) Often a federal agency is unwilling to reimburse a university for the fraction of a staff member's "released time" from teaching during the academic year if the investigator is a tenure member of the staff. (2) The overhead allowed is often not enough to cover all indirect costs. Nevertheless the following table[*] shows that federal contributions can be regarded as a most effective means of increasing the research coverage obtainable from a university's own research contribution.

Federal and University Contributions to Costs of Federally Sponsored Research in the United States
(in millions of dollars)

	1953-1954			1958-1959		
Agency	**Federal contribution**	**University contribution**	**Total**	**Federal contribution**	**University contribution**	**Total**
Department of Defense	159	15	174	179	17	196
Atomic Energy Commission	89	5	94	166	12	178
Department of Health, Education and Welfare	19	13	32	79	40	119
National Science Foundation	1.4	1	2.4	38	[illegible]	63
Others	18	1	19	34	1	35
Totals	286	34	320	496	95	591

The above table gives the magnitude of federal spending for research. It also shows that not all federal projects require the same amount of supplemental aid. This is due in part to the fact that the Departments of Defense often have some specific problems requiring a solution and, therefore, usually allow more liberal project financing. They have shown a surprising and remarkable understanding of the necessity for basic research; yet they are charged with many more fundamental duties. It therefore follows that they must take other factors besides scientific merit into account when they sponsor a project.

The Atomic Energy Commission sponsors a great deal of basic research, but its field of activity tends to be somewhat narrow.

The Department of Health, Education and Welfare can serve the purposes of the graduate school in many ways but does not usually support the extremely technical scientific projects, except in special areas, through its Public Health Service and National Institutes of Health.

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[*] C. C. Furnas and R. Ewell, taken from the McGraw-Hill Book Co. publication, **Financing Higher Education, 1960-70** (1959).

The National Science Foundation could be the most useful to us, but the competition for its research awards is fairly severe. It can be helpful through fellowship grants both to graduate students and faculty. It also can supply a limited amount of support for laboratory facilities.

The only group which might help finance new buildings is the Advanced Research Projects Agency. It has recently embarked on a program of study on materials (solid state physics, etc.) and is establishing "research centers." While it is true that research centers are usually unrelated to a college's teaching functions, there is the possibility of using their research problems as doctoral theses. Unfortunately such contracts will probably be awarded on the basis of the previous research accomplishments of an institution.

A very desirable type of sponsored basic research of recent origin is one which merely specifies the general field of activity. Presumably contracts will be awarded on the basis of the past research performances of both the institutions and researchers. City College can aspire to such contracts, but will probably first need to demonstrate its ability on more conventional projects.

In order to guard against wishful thinking, we offer a summary of important government policies. Excerpts from the government documents stating these policies are to be found in Appendix Q.

1. There is no basis for regarding federal sponsorships of basic research as a convenient subterfuge for federal financial aid to institutions of higher learning.
2. The federal government assumes active leadership in encouraging scientific research, but this does not mean that the increase is to come entirely from federal sources.
3. Federal sponsorship does not imply centralized control or management.
4. The potential of the scientists exceeds the support available by a considerable amount. For example, the National Science Foundation has upon occasion been able to provide grants for only about one-third of the investigations judged by its scientist-reviewers to have great merit.
5. After a proposal for a research project is submitted, a confidential investigation of "facilities of the school and capabilities of the staff" is made by the government agencies. Lack of space and equipment, heavy work assignments in addition to the contemplated research, and the like, handicap a staff member who is competing for grants with staff members of institutions specifically geared for research.
6. There is an unwritten policy which influences the granting of contracts: when choices are to be made, "Support the man, not the project." Past performances of schools and investigators carry great weight.
7. Most agencies do not allow contracts to be undertaken by researchers on an extra-compensation basis except during the summer months.
8. Research projects of the applied and developmental type are being awarded less and less frequently to universities. They are usually done in government laboratories, research institutes, or in industrial laboratories.

A summary of the federal budget for basic research for the fiscal year 1960 will also be found in Appendix Q.

Thus far we have been concerned with grants, projects, and contracts which can unquestionably be classified as research, projects which are intellectually stimulating, which result in the intellectual growth of the staff members doing them, and which enhance the reputation of the school in which they are done. If a school and its faculty are willing to undertake contracts for unoriginal, mechanical work merely for the sake of activity or possible financial profit, then much of what has been said is no longer applicable. These activities do not help the reputation of a school and may be termed the endowing of the institution at the expense of the faculty.

Conclusions and Recommendations:

That the college do everything in its power to obtain research contracts and grants from the federal government. An effort should be made to provide potential researchers of the staff with those requirements which will enable them to compete for grants more successfully.

Federal Grants and contracts are by their very nature both problematical and sporadic. While they should be sought with fervor and diligence, they ought by no means to be considered as the foundation of our graduate and research program. State and municipal appropriations must be counted as the primary wellspring of our resources for these purposes, particularly so at the outset of our expansion.

Tuition and Fees:

The third largest source of funds for publicly controlled universities is student fees (11.7%). Our present fees are:

Graduate Field	Cost per credit	Yearly cost per equivalent full-time student (30 cr.)
Liberal Arts	$15.00	$450.00
Business Administration	15.00	450.00
Engineering	25.00	750.00

These fees are among the highest of the publicly controlled schools in the United States (see Appendix R). The present cost of full-time instruction to the student in our graduate Engineering School is the highest charged by any publicly controlled institution surveyed, because the charter of the city colleges does not mandate the support of graduate instruction.

This Task Force takes the position that it is unreasonable to expect student fees of the magnitude charged in public colleges to pay the entire cost of a doctoral program—certainly not of one of which we can be proud.

To demonstrate, let us consider even our relatively high figure of $15 per credit for a 2 credit course. Assume a class size of 20 (a large class for a doctoral level course in many fields). This would yield an income of $600. Under present conditions at this college, an instructor is expected to teach five such courses per semester if he teaches only graduate courses.* Even if the total income were used to pay the instructor, he would be receiving $3,000 per semester, or $6,000 per year.

This figure is completely unrealistic. In the first place no top-flight school requires any such teaching schedule (see the section on "time necessary to de research"). In addition, it would be impossible to staff a good graduate school with reputable scholars by paying an average salary of $6,000 a year for full-time teaching. This figure also does not make any provision for overhead, library costs, physical facilities and equipment, administrative costs, and other incidental expenses. Furthermore, it fails to provide for the material necessities and the supervision of the doctoral research; in many fields, particularly in the sciences, this is the major expense.

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* Under the 3:2 ratio of equating graduate work to undergraduate teaching, the basic 15 hour load at the college is equal to 10 hours of graduate-course work.

Unless a graduate school receives financial support from the state or municipal government, it must be considered to be a private school. Private universities in the City of New York which support good graduate programs are unable to meet expenses with fee charges of $40 or more per credit. The deficit is met by using the income from endowment funds and by gifts from the alumni, the public, and other sources.

It might be thought that the present graduate programs at The City College, ostensibly operating on the income from student fees, disprove this gloomy argument. Such a belief would be unfounded, however, for the following reasons:

1. The present graduate programs with but few exceptions terminate at the Master's level. There is a greater demand for such instruction, and such classes usually can be larger than those at the doctoral level. They therefore cost less per student.
2. By terminating at the Master's level, the college avoids the costly physical requirements for, and supervision of, the doctoral thesis.
3. The graduate engineering and business programs, at least, make extensive use of many part-time employees by offering "additional compensation" to a staff member already carrying a heavy teaching load or employing a man having other full-time employment as his major interest. This type of instruction can be less costly, but as a normal practice it is very doubtful if excellent instruction and adequate guidance of doctoral candidates can be secured in this manner.
4. The present accounting systems of the graduate fields do not reveal the total costs of the programs. For example, the present device of "budgetary interchange" usually replaces a capable professor, whose salary is charged to the undergraduate school, with a young man at a smaller salary in the undergraduate school. This enables the professor to give the graduate course while the graduate school is charged only the salary of the substitute. It is a question as to how much of this sort of thing can be done without harm to the undergraduate program which is our primary concern.

Conclusion:

The Task Force is not unanimous in its opinion as to how much of the cost of a graduate education should be supported by student fees. Some feel that in this metropolitan area, in which most of the students have some part-time or full-time employment, they are able to pay fairly high fees—say $25 to $35 a credit. This would enable the present school to pay the part-time instructional employees competitive salaries. Others feel that the traditions of the school and the welfare of the student body require a low-cost—even a free—graduate school.

The latter group feels that the students in New York State should be given as much help in securing a doctoral degree as are the residents of other states. Most other states not only finance low-tuition graduate schools but help support a large portion of the graduate student body by means of fellowships and scholarships. (See Appendix U).

Research in Applied Science, Particularly in Technology and Business

There is no doubt about the tremendous importance of "basic" research particularly in the natural sciences. Without it the country will lag in its struggle for survival in both the economic and military competition against more singleminded and ruthless social structures. We should, therefore, if for no other reason, do everything in our power to gain all the support possible for such activities. Yet even if we lacked financial backing for such research, partial compensation might possibly come from the research sponsored by industry as well as from contracts for "development" projects in the applied fields which are sponsored both by industry and governments.

One of the surprising results of the study made by the Council for Financial Aid to Education, "Voluntary Support of America's Colleges and Universities," in 1958-59, was the revelation of the extent to which industry was supporting both the private and public universities. Of all the schools reporting, it was a public institution, the University of Michigan, which drew the largest volume of support by business concerns ($5,036,243). This situation was not fortuitous. We quote Harry H. Goode, Assistant Director of the Engineering Research Center of the University of Michigan, "... Finally the two assistants to the director are expected to get out and contact, in one case, the industries and in the other, the government agencies, so as to bring our services continuously to their attention."

There would seem to be some repugnance on the part of universities to undertaking "applied" research. The first objection of some persons to such work is the rather vague one that it is "beneath the dignity of the school." Other objections are that we would then compete with private groups organized for profit; that in furnishing such funds, industry might gain some control over the institution's policies; that it might divert research talent from "basic" investigations and redirect into other channels the energy needed for teaching.

These objections hardly can be sustained, so long as such work is creative and is kept within bounds. When we consider some of the benefits to all to be secured through "applied" research, we might possibly be putting too high a price on dignity if we sustained any such argument. The development of nuclear power for industrial uses; the economical conversion of salt water to fresh water, to be used in water-deficient areas; the production of higher speed machinery; the building of stronger, lighter structures; the finding of better metal alloys and new drugs and plastics; and the improvement of public policy and business performance, and the like, are hardly unsuitable concerns of a school built to serve the community.

It is true that we would be competing with private groups. However, an engineering professor, for example, is probably a better professor if he is also currently engaged in solving some real engineering problems. One can hardly justify any group which would argue that, because it might be contrary to its interest, a professor of engineering should not practice some engineering, an accounting teacher should not practice accounting, a teaching doctor should not practice medicine, an economist should not serve as a consultant, and the like. The amount of such outside activity is, and can be, limited by the school so as to be beneficial to both school and teacher.

The objections can all be met by having the administration maintain a proper balance in the time allotted to the various duties of the staff members. There are many advantages to such research activities:

1. Such research may promote the intellectual growth of a staff member about as well as does "basic" research.
2. Such research pays all of its costs. Some such investigations may even show a net profit. A neighboring institution is reputed to charge from 50 to 100% overhead on such contracts.
3. It could afford the staff an opportunity to do creative work at the college for "additional" compensation. In other words, "outside employment" for additional compensation now becomes a campus activity and is subject to survey by the administration.
4. It would build up the physical equipment of the laboratories and workshops.
5. It gives the teachers of professional subjects some practice as "professionals."
6. It would enable the school to give impecunious graduate students part-time employment at reasonable wages as laboratory assistants, etc.
7. It would enable the business firms of the community to secure competent research aid for special investigations without the necessity of building up their own research staff for projects of short duration.
8. The city could use the college to solve some of its own technical problems.
9. The greater possibilities for research and adequate compensation for such work would place the college in a far better position to attract new holders of doctorates in all fields as faculty members.
10. "Practical" problems whose importance the student understands provide a powerful motivation for further study.
11. Students become aware of the problems of the industries of the community and may make profitable connections.

Applied research contracts, as well as federal contracts and grants for basic research, could be handled by the proposed "City College Research Foundation."

Financially Profitable Scholarly Activities Other than Research

The college has many opportunities to serve the community through projects which pay their own way but which cannot possibly be classified as research. The most obvious example is by meeting the needs of local industries and governments for special instruction of their employees and supplying the service under a suitable financial arrangement.

One branch of the graduate engineering school of a neighboring state university derives a major support from such activities. In another state, the University of Maine's Department of Industrial Cooperation serves the community profitably by making available among other things:

1. Engineering Consultation and Surveys.
2. Chemistry and Physics Research and Development.
3. Pulp and Paper Research and Development.
4. Food Products Research and Development.
5. Community Economic Surveys.
6. Marketing Surveys.
7. Personnel Programs.
8. Economics and Financial Analysis.
9. Pension Plans.
10. Plant Safety and Industrial Engineering.

11. Language Translation Service.
12. Fuel Analysis.
13. Fertilizer, Drug and Bacteriological Analysis.
14. Advertising Studies.
15. Fire Safety Testing, etc.

Somewhat similar services could be made by our college to yield a revenue which could be used to provide additional support for the graduate and research programs.

All such activities would have to be examined very carefully because:

1. Many might be merely activities which yield only a small profit when the true cost is taken into account but which would reduce the amount of service of competent instructors to the college.
2. They might replace some of the activities which lead to the intellectual growth of the faculty.
3. Many of the faculty are already engaged, in a private capacity, in activities of their own choosing.
4. Some faculty members chose their present profession, at least in part, to avoid this type of work.

Other Sources of Income (Voluntary contributions):

It is to be clearly understood that the sources of income already considered are expected to be the major ones. Nevertheless, other sources should also be examined.

A realistic appraisal of funds that might be raised through voluntary contributions requires a knowledge of the current pattern of giving. In this regard, a study made by the Council for Financial Aid to Education entitled "Voluntary Support of America's Colleges and Universities," in 1958-59, is most informative. The report surveys 1,071 schools. Much of the information which relates to publicly controlled institutions is to be found in Appendix S. It shows that during that academic year, individuals were the largest contributors (approximately 300 million dollars). It shows that corporations donated almost 100 million dollars, while foundations and other groups donated about 140 million dollars. Corporation support is somewhat understated since the survey excluded contract and applied research.

Percentagewise, these amounts are only a small part of the expenses of the various schools.* Nevertheless these sources should be cultivated continuously.

For many colleges, the Alumni Association is specifically charged with the task of raising funds from the alumni while the whole college, but particularly the administration, has the responsibility for obtaining non-alumni support. The council's report shows that, on the average, gifts from non-alumni aggregate about the same amount as do the alumni contributions. At City College, The City College Fund, now in its eighth year, is a useful and helpful adjunct of the undergraduate college; but it has not yet demonstrated that it has the potential to launch or to support graduate work of significant proportions.

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* In publicly supported 4-year-colleges (364 colleges surveyed) it constitutes only 2.8% of the income. Source: "Where is the Money Coming From?" A publication of the Council for Financial Aid to Education, published in 1959.

There are about 5,000 recognized foundations, but 110 of them with assets of over 6 billion dollars (1957) account for about 90% of the giving. The more obvious projects which might secure private foundation grants are:

1. Scholarships and Fellowships for both student and faculty.
2. Aid in the starting of new projects, particularly when such programs if successful have a reasonable probability of having the financial burden assumed by others. (Fees, state, city, etc.)
3. Aid for research directed at least in part toward the bettering of the health, physical well-being, or social relations within a community.

The distribution of foundation grants is to be found in Appendix T-1. It should be remembered that the grants for educational purposes listed in the tables cover all levels of education. Foundations support some research (see Appendix T-2).

It will probably be difficult to secure foundation support for a conventional Ph.D. program at this college, since much foundation giving is characterized as initial support for "creative ideas." In fact, it is criticized by some as "novelty experimentation."

The recent $700,000 grant to the Polytechnic Institute of Brooklyn by the Ford Foundation is typical of such philanthropies. It will enable the college to initiate a program which hopes to carry the exceptional entering freshman to a Ph.D. degree in six years after high school graduation. Without discussing the feasibility and probable scholastic merits of such programs, we merely note that the money is given to enable the school to write the new and necessary textbooks and meet the organizational expenses of a novel science program. It occurs to us, however, that Foundation directors are reasonable men, and that they might see in New York's municipal colleges an untapped reservoir of graduate school strength strategically so important as to require generous and statesmanlike subvention of graduate work at The City College and her sister institutions, particularly in the initiating phase.

The Corporation Foundations are described by F. Emerson Andrews of the Russell Sage Foundation in "Philanthropic Foundations," thus:

> Corporation Foundations differ in important respects from other types. Unlike the great research foundations (but like many family foundations) they seldom have a substantial corpus, but are more nearly channels for current giving, with just enough reserves to level out the years of low income. However broad their charters, these programs seldom aim at 'the welfare of mankind' but only the portion of that welfare that benefits the corporation, its employees, its stockholders or business relationships.

Their existence and continued growth is probably due to the fact that tax deductions are now allowed on such charitable gifts. This college, with a reservoir of the most capable and well-trained students—all potential young employees—and with a faculty whose talents could be of use to local industry, could be just "the portion of that welfare that benefits the corporation." More recently many corporations seem to be becoming aware of their debt to graduate schools for the production of the well-trained specialist and others who are essential to their well-being.

They are currently giving considerable money to both public and private universities (Michigan, Indiana, Minnesota, etc., as shown in Appendix S) to aid both the research and other worthy activities of these schools. This source, if actively encouraged, might eventually support a sizeable portion of the research budget.

D. COST OF A GRADUATE PROGRAM

Introduction

Quality is a major factor in determining the price of most material things. Research and graduate programs are not exceptions. The quality of doctoral programs at this college could lie between wide extremes. Their worth to a school must be evaluated in terms of additional prestige and facilities which aid in attracting good students, a strong faculty, and financial backing. The value of a program to the student is determined by comparing it with what is obtainable by going elsewhere.

It is easy to visualize a program which would apparently cost the college little or nothing. Assume the staff to be employed on an extra-compensation basis. Even assume that the instructor's compensation is raised to $20 per credit-hour or about $300 per credit per semester. Assume the doctoral research to be much less carefully guided than is anticipated in this report. It might be carried on by regular day session teachers on an extra-compensation basis at a cost of say $2,000 per year per field covered. The program could be confined to fields where little or no experimental equipment is required or where sponsored research (much of the "applied" sort) would pay most of the expenses. By "budgetary interchange" and other such devices, much of the true overhead could be shifted to the undergraduate college. By such devices the apparent yearly cost of a single small thirty credit post-Master's program might be:

Instruction	30 x 300 =	9,000	
Direction of research		2,000	
Overhead		1,000	
		$12,000	per program annually

Such a program could easily show a "profit" if even a fairly small number of students enrolled, for if one assumes only an average of 16 students per class at $25 per credit, then the income per year is 30 x 16 x 25 = $12,000.

The Task Force mentions this possibility in order to reject it, for if it became the permanent structure, both the college and the students might possibly do better investing their time and efforts elsewhere.

For reasons to be given, such a program would tend to lower our standards and even hurt the fine reputation of our undergraduate school. In the long run, if the standards of a school are not maintained and its reputation suffers, good students may fail to attend and others will attend when no other place is open to them. Furthermore, once such a program were in operation, Gresham's law would operate. An acceptable program would be unrealizable.

It has already been shown that the present teaching assignment itself, if conscientiously discharged, will occupy a normal work week. In the past some faculty members have been able to do some research or additional teaching or both by increasing the number of hours in their work week or by giving their students less attention. Yet even if both were done, it is felt that not enough time could be found to stay abreast of recent developments in at least the more severe disciplines and to show the leadership in research required of a good sponsor of doctoral candidates. In good graduate schools, the sponsors are men who have for a decade or more devoted themselves almost exclusively to research and who carry 0 to 6 hour teaching schedules, usually directly related to their field of investigation.

The other extreme is exemplified by the private or state supported university specifically organized and fully supported as a combination graduate and undergraduate institution. One such great school on the eastern seaboard confided in us that its merit and quality are recognized throughout the world at a true cost of $3,600.00 per year per graduate student (1959).

Research Costs of the Faculty

The first step in the establishment of doctoral programs of recognized merit would be to make it possible for the level of true research activity in all fields concerned to approximate those in existence elsewhere. This requires fairly sizeable amounts of money. The sources of such funds have already been discussed.

It was shown previously by means of national statistics that the average institution of higher education spends about 50 cents on research for every dollar spent on instruction. This average includes the great research institutions as well as purely undergraduate schools whose research practices are quite different. An estimate of current practices in science and engineering schools is given in the *Journal of Engineering Education*, Vol. 50, March, 1960, by Ralph A. Morgen in a paper entitled "Sponsored Research —Good or Bad?"

In this paper, Mr. Morgen, formerly the Research Director of the Purdue Research Foundation, and now President of Rose Polytechnic Institute, gives a rule of thumb for apportioning the school funds between its research and teaching functions.

1. For schools offering only engineering or science work to the Bachelor level, 25 cents should be spent on research for each dollar spent on the teaching function. He feels that his figure should not be less than 10% nor more than 50%.
2. For schools offering the Master's degree about 50% should be budgeted for research. He feels that at such schools the figure should not fall below 25%. If it rises to a 75% or 100% ratio of research to teaching the doctorate should be under consideration.
3. For schools offering a doctorate, about as much should be spent on research as on teaching. If the figure falls below 50% of the teaching budget, a very weak doctorate program is indicated. If the research budget gets to be 200% or more, there is an overemphasis on the graduate research program.

Other estimates of costs also lead to conclusions not very different from the above. The following is typical of the information supplied by good universities, and if it is in error, it is on the conservative side. The Dean of a moderate-sized state university said, "We have found that a faculty member engaged in research will require an operating budget equal to his salary or that portion devoted to research. Research in the life sciences and engineering may require more, and research in the humanities and social sciences less. The average cost, however, follows the general principle cited above."

While the replies from the fifty-one best known universities were far from complete, they were useful. The range of research costs reported for the faculty's research was from about $1,000 to $20,000 per faculty member engaged in research. Research in the natural sciences at the best schools more nearly approximate the higher figure.

To check these figures we can cite the cost of research projects as reflected in the various government contracts and grants. Another check is afforded by the publication of the National Science Foundation, *NSF, 59-60,* "Science and Engineering in American Industry—a Report on a 1956 Survey," which asserts: "The average cost of research and development programs of manufacturing and other industries was about $32,000 per scientist or engineer in 1956." Since this figure includes the man's salary, which, let us say, is about $10,000 per year per researcher, and since this figure probably includes some administrative costs which would not be charged to research at a school, this would seem to be a good check of the $15,000 to $17,000 figure given to us by many of the "top" research schools.

The following is a minimum estimate of the cost other than salary of a fairly good research program at the College once research programs are well established and the doing of research at the college becomes a more usual faculty activity. Assume one-half of the permanent teaching faculty does research, $\frac{630}{2} = 315$ researchers; assume that on the average one-third of their time is spent on research. Hence there are $\frac{315}{3} = 105$ "effective full time" researchers. Assume the "moderate sized" state university's statement cited previously to be correct—"[research] will require an operating budget equal to his salary or that portion devoted to research." Also assume an average salary of $10,000 per year. Hence the total cost other than salary is about $\$10,000 \times 105 = \$1,050,000$. Assume that it be required that all research shall be creative, but that "applied" research be permitted to be part of the program. Under such conditions we might expect that the federal government, foundations and industry would bear about two-thirds of the total cost. *Hence the cost to the college other than salary would be* $\frac{\$1,050,000}{3} = \$350,000$ per year.

This is a trivial sum compared to the benefits which would accrue to the college and is less than 3% of the total college budget. It is reasonable to believe that we cannot improve greatly on the operating efficiency of other research groups and that some basic support of research by the college itself is necessary. Every effort should be made to secure the necessary funds from the state, city, alumni, foundations, and friends.

This step should be taken as soon as the necessary physical facilities are available. Engineering graduate research should be expanded as soon as the new engineering building is complete. The funds supplied by the college should become increasingly effective as the programs gain momentum and attract the favorable attention of possible sponsors.

Cost of a Teaching Schedule Reduction for Research

A research and graduate program presupposes that the staff will be allowed adequate time to carry out its duties. Sponsored research often provides funds to pay a substitute to carry a portion of the researcher's normal teaching-load during the academic year; but not always. In any case it does not provide schedule reductions for all who must have reductions if successful research and graduate programs are to be insured. We have shown that serious researchers almost never are required to teach more than 6 to 9 hours per week at any of the undergraduate-graduate schools that have stature. The necessity for extensive professional reading, study, and the like precludes heavier teaching assignments. If we are to compete with such institutions, in the departments undertaking graduate work at least, some staff members must be treated likewise.

The college must, therefore, always provide the basic and continuing support for research, even though one can expect research grants and contracts to pay for a good portion of the "released time" of the staff after the college earns a fine research reputation. A very modest suggestion is that one "effective full-time schedule" be allocated for research for every ten full-time teaching schedules. Since there are about 620 to 630 such schedules, 62 such allowances would be made. (Actually these schedule allowances will be subdivided into many more partial ones and distributed so as to secure maximum effectiveness.) If it be assumed that these allowances are secured by employing temporary substitute teachers at an average salary of $8,000 per year, then the cost would be about $8,000 × 62 = $496,000 per year.

If it be assumed that the necessary physical facilities in the form of adequate laboratories and offices were to be provided, and if the funds for faculty research and schedule reductions for research were secured, then the whole character of The City College would change gradually—regardless of whether a doctoral program was undertaken or not. The cost of such activities would increase the budget by a mere 6%, yet would transform the college into a true intellectual leader. In the past, in the main it has generally been regarded, at best, as an efficient expositor of the ideas of others.

The Cost of a Liberalized Sabbatical Leave Policy

If the costs of the previous two items alone were met, The City College would become a fertile ground for research. If additional funds can be secured, a new sabbatical leave policy that would stimulate research should be considered. The college has been unduly restrictive as to compensation in granting sabbatical leaves, and range of permitted activities. All this has been treated elsewhere.

The maximum possible cost of the liberalized sabbatical leave policy can be estimated as follows: Let us assume that every regular full-time teacher receives a one-semester sabbatical leave, at full pay, after each fourteen semesters of service. There are about 620 such teachers. It follows that at any time about $\frac{620}{14}$ or 44 substitutes would be needed. A possible cost of such a liberalized policy thus would be about $8,000 × 44 or $352,000 per year.

Such an estimate is too high because it does not take into account full-year sabbatical leaves. Such leaves need cost the college but little. If, for example, an associate professor earning approximately $12,000 takes such a leave, the $6,000 withheld should normally cover most of the cost of a substitute teacher. However, on the basis of our experience, we would expect that most of the sabbaticals would be of the half-year variety.

It would, therefore, seem that about $250,000 per year should cover the cost of the liberalized sabbatical leave policy.

In our opinion this would be a small investment for so valuable a cause.

Costs of Fellowships and Scholarships

Most graduate students are extremely ambitious and capable. It is in the public interest to ensure that the best of these have the opportunity to secure graduate training regardless of their financial health. The participation of such students in scholarly discussions, their keen perception, and their critical analysis of the course content are essential to dynamic graduate programs. Their researches enhance the reputation of the schools that sponsor them.

Most schools feel that such students are worthy of financial support (see appendix U). A considerable number of fellowships and scholarships are offered by the universities themselves; others originate in public and private grants. A National Science Foundation study* shows that "half of all resident students of the natural sciences and engineering held assistantships or fellowships in April 1954." About one-quarter of all graduate students were securing such assistance, the median stipend being reported as just under $1,300. This median stipend is almost certainly higher today.

It would therefore seem reasonable eventually to provide about 125 fellowships at The City College. This would help the ten assumed doctoral programs to attract outstanding students in these areas. An average stipend of about $1,600 would enable these students to devote most of their efforts to their studies.

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* National Science Foundation, "Graduate Student Enrollment and Support in American Universities and Colleges," NSF, 57-17 (1954).

The annual cost of such a program would be 125 × \$1,600 = \$200,000 per year. This seems a very insignificant outlay to ensure the presence of the highest type of scholar on our campus.

Cost of a Doctoral Program

Once The City College has established a deserved reputation for effective research, either through the minimal research aid program outlined previously or through the more elaborate and costly support given by many good private and state universities, a doctoral program will follow easily and logically. The Master's-degree students will learn about the current researches from their friends and acquaintances, and through publications and classroom discussions. The interest of good students will be aroused and a graduate school of which the college can be proud will be a natural consequence.

The net cost of the instruction for such a doctoral program to the college will depend to some extent upon the number of students enrolled. The expenses of an adequate program can be estimated within reasonable limits, but the income from fees will depend upon its popularity as much as upon the per credit charges.

The basic assumptions of our cost estimate are:

1. The quality of the program will be such that with but few exceptions it will be staffed by permanent faculty members having the graduate school as a major interest. An average graduate salary of \$12,000 per year is assumed.
2. An overhead of 50% is assumed for the library, administration, and other expenses.
3. It will be assumed that the number of courses given is limited to those normal to a doctoral program in the subject and that overlapping, duplicating, and highly specialized material for the very few are eliminated or, when necessary, are handled by special devices such as self-study supplemented by staff consultation. Hence, it is assumed that course offerings in any one field beyond the Master's level are limited to a total of 45 credits, and that ordinarily each course is given every third semester. Thus on the average, courses beyond the Master's level totaling 15 credits will be offered each term in all fields covered. This can easily be handled by the equivalent of two "full time effective" teaching schedules even with the light teaching schedules found in good graduate schools. In addition, in each field one "full time effective" teaching schedule is allowed for guidance of the various doctoral candidates' research. (These "effective full time" schedules will in reality be shared by many staff members.)
4. The programs will admit only the very best students. Until adequate support is secured for such programs, they should be no larger than the above three "effective full time" teaching schedules can carry readily.

Hence, Cost per Field Covered

Instruction	3 x 12,000=	36,000
Overhead for library, administration, etc.	.5 x 36,000=	18,000
Total cost		=\$54,000 per yr.

The income from fees will be variable, for it depends on the enrollment. If the college sponsors programs of recognized merit, then large classes, even at the post-Master's level, can be expected in some disciplines, (engineering, business, chemistry, psychology, etc.) The chairmen of the various departments and the academic Deans should be able to make a better estimate of probable enrollment than the members of the Task Force. For the purposes of this report, an average of 25 students, (probably too large) will be assumed in each post-Master's class at $25 per credit.

Income from fees per year (two terms)
30 x 25 x 25=18,750

Net amount of basic support necessary per program per year $54,000 - $18,750 = $35,250 per year for instruction.

Much of the student's doctoral research can be made auxiliary to the sponsored research of the staff. In fact, in many cases where a professor directs many doctoral candidates, his research becomes blended with that of his students in the form of joint papers and the like. For this reason, and since the cost of staff research has already been covered, the following low estimate of the additional cost of all student research is $100,000 per year.

Assume that eventually ten such programs will be carried:

Net cost to the College

Instruction and doctoral thesis supervision 10 x $35,250	=	352,500
Cost of research in addition to the cost of staff research		100,000
Total cost		$452,500 per year

If we add this to the cost of staff research and fellowships for graduate students, the total is about $1,800,000 per year.* The average institution of higher education budgets about 50 cents for organized research for every dollar spent on instruction. If we were to do likewise, The City College would spend $5,000,000** per year for research alone. We request only about 36% of the above for both graduate work and research in order to support a relatively small minimal program of high quality. A larger doctoral and research program would require much greater financial support.

Positive thinking demands that the faculty, administration, alumni, and friends devote their efforts towards securing the additional monies necessary to build a graduate school worthy of the undergraduate college.

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* $2,500,000 including expected "sponsored" research.

** Total instructional costs at City College, 1957-58 ; $10,348,968.67. Financial Report, 1958, p. 12.